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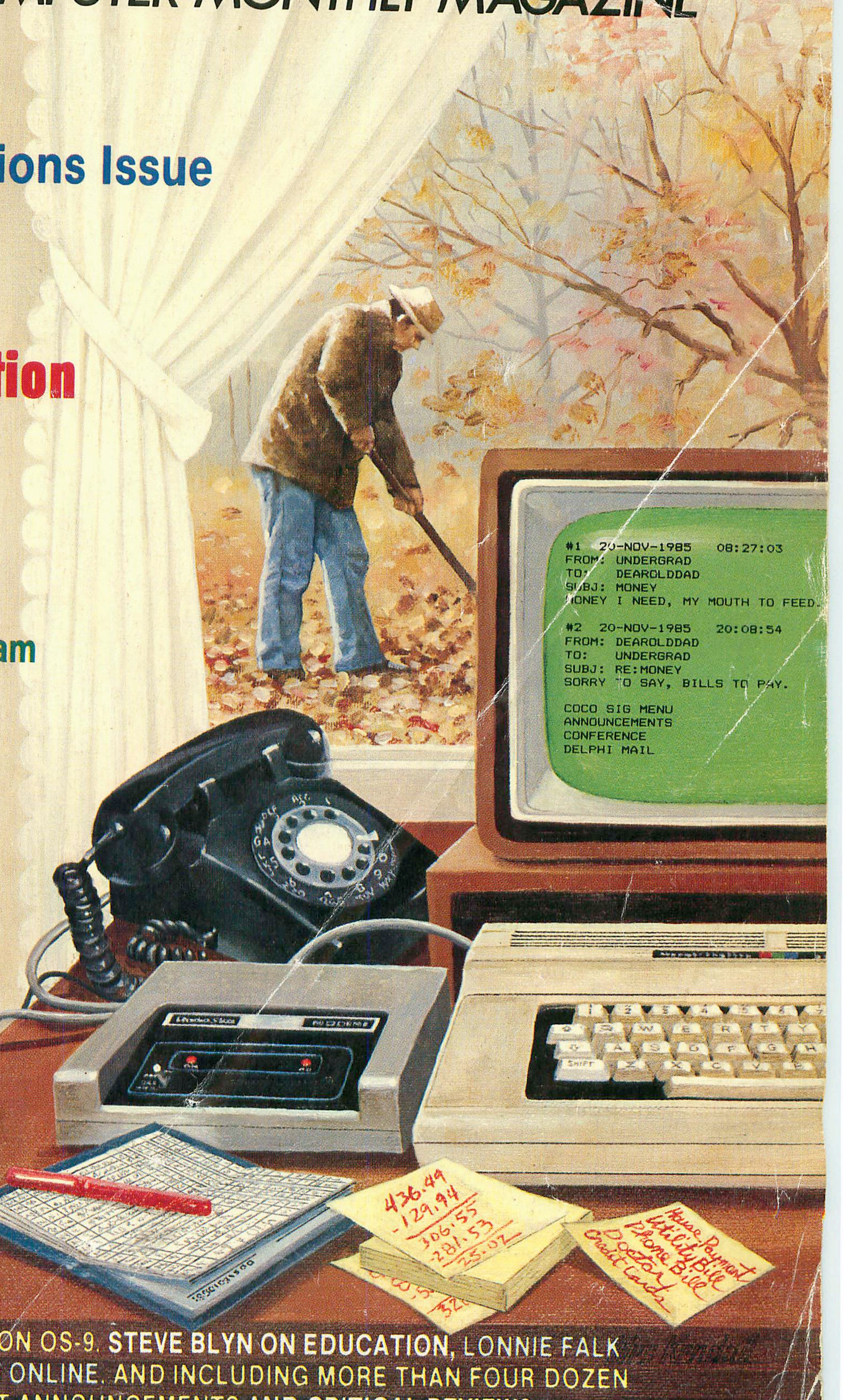

```
#1  20-NOV-1985   08:27:03
FROM: UNDERGRAD
TO:   DEAROLDDAD
SUBJ: MONEY
MONEY I NEED, MY MOUTH TO FEED.

#2  20-NOV-1985   20:08:54
FROM: DEAROLDDAD
TO:   UNDERGRAD
SUBJ: RE:MONEY
SORRY TO SAY, BILLS TO PAY.

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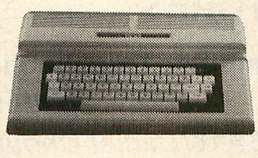
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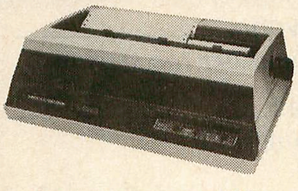
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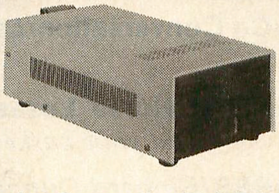
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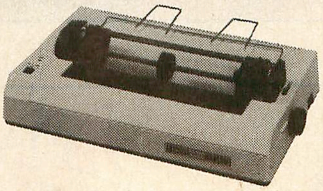
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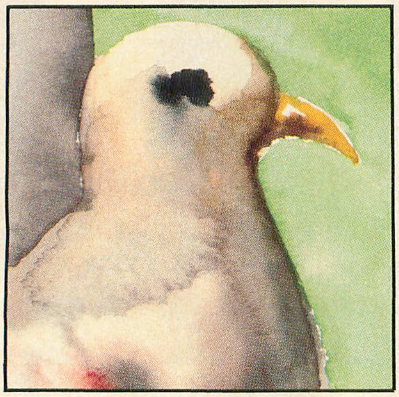
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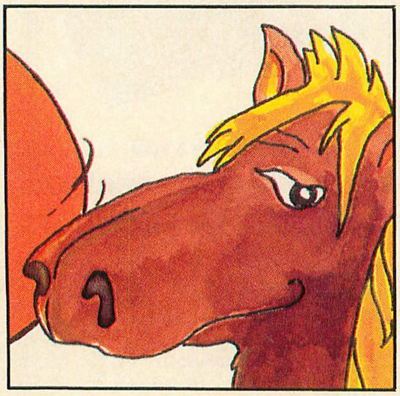
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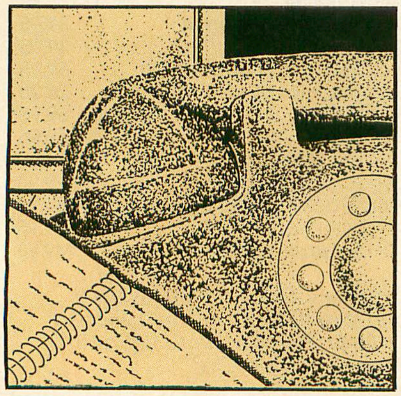
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▭ The small cassette tape symbols beside features and regular columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE, ready to CLOAD and RUN. For full details, check our RAINBOW ON TAPE ad on Page 151.

NEXT MONTH: Our Holiday issue will help get you into the festivities of the season with some special music and graphics features. CoCo will perform accompaniment for caroling with *Christmas Songs* and tell the story of "Rudolph the Red-Nosed Reindeer" in graphics illustrations. Fred Scerbo's "Wishing Well" will include a special holiday game, or enjoy a twist of trivia with *Tic-Tac-Toe*. Also, Dennis Weide will present part one of a two-part hardware project that shows how to use your computer as a "burglar alarm" device.

Stuff your stocking with December's RAINBOW for a host of gifts that last all year 'round — utilities, games, and hardware and software reviews — and let CoCo brighten the holiday season.

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November 1985 Vol. V No. 4

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LETTERS TO THE RAINBOW

Roy G. Biv's True Identity Revealed

Editor:

I thought some (if not most) of your readers would like to learn the history of Roy G. Biv. I also met him in high school just as you did — in fact, probably in physics class. If it wasn't for Roy G. Biv, we would not have the rainbow. Roy G. Biv is [a memory device for recalling the order of] the seven primary colors in a rainbow:

R ed
O range
Y ellow
G reen
B lue
I ndigo
V iolet

If you look at a rainbow, you'll see the colors in that order. Congratulations to THE RAINBOW on a job well done.

Allen S. Culp
Drums, PA

Editor's Note: Right you are, Allen! Keep following Roy and THE RAINBOW.

COMMENTS

Editor:

A letter from Roy Davis appearing in the July 1985 RAINBOW [Page 8] inspired me to respond. Yes, Roy, there is a good SAT program available for the CoCo. Unfortunately, Radio Shack has locked it up in their Home Sales division and will only sell it as part of a much more expensive package.

In the same issue a letter from F.C. Caswell [Page 6] complained of programs that won't work with a disk system installed. I go one step further. I won't buy programs that either aren't on disk or can't easily be transferred to disk. The major reason is that I have three children who use the computer and I am afraid they will damage the computer by continually unplugging the drives.

Dan Wolfe
Marietta, GA

Simpler to Pull the Plug

Editor:

I am really appalled by the letter that F.C. Caswell wrote which appeared in the July 1985 Anniversary issue of THE RAINBOW [Page 6]. He said it got him very upset when someone told him he had to disconnect his disk drives in order to run a certain program. He also said the programs should be ready for disk and include a tape modification.

Maybe some of us CoCo users cannot afford $200 plus to buy a disk drive for the Color Computer we presently own. It would really be a dumb idea to write programs for disk and include a tape modification. After all, many beginners who *do* have the tape recorder for their CoCo but do *not* have the disk would get confused by having to modify the program. Keep things simple. After all, how long does it take to unplug your disk controllers compared to having to modify an entire program?

Kenneth F. Johnson
Bangor, ME

Editor:

I am responding to Ric Miller's letter in the July 1985 RAINBOW issue [Page 8]. He was concerned about some method for the Color Computer to control professional music synthesizers. Our company produces a MIDI interface called the Color Midi Connection which serves this purpose.

MIDI stands for Musical Instrument Digital Interface and is installed practically in all new synthesizers, rhythm units, sequencers and other devices of this sort. This interface allows sequencers and computers to control these instruments.

We have a sequencer software package called *SynTrax* that controls a MIDI system composed of many synthesizers. By the way, the Color Computer makes a powerful controlling device for these musical instruments.

If anyone else is interested in this type of activity, please write us a brief letter and we will be glad to send you additional information about our products.

Frank M. Cutolo
Intercomp Sound

HINTS AND TIPS

Editor:

After checking in three stores and going to my favorite place to buy THE RAINBOW for the second time, I finally bought the June 1985 issue.

The first article that caught my eye was "Chopper Assault" on Page 28. After several hours, I had the program typed in (I know I should get RAINBOW ON TAPE), and as normal bugs and typos were not allowing me to complete the game, I decided it was time to read the article. I was very disturbed to notice the last sentence in the next to the last paragraph: "*Chopper Assault* does not work on a disk-based system."

Well, after all that work, I was not about to give up, so with the changes noted below, I got *Chopper Assault* to work on my disk-based system.

```
Line 330 V1=RND (191): V=RND(255)
:01=100:02=100:EM=200:50=96:DS=96
:AB=127
```

Also, everywhere `AS` is found, it needs to be changed to `AB`. `AS` is found on lines 330, 520, 540 and 760.

Gerald J. Norman
Mesa, AZ

The Price is Right

Editor:

At the Columbia, Mo., Amateur Radio Hamfest, I purchased three sets of 64K chips at a price of $12.50 per set of eight. The chips are 150 ms and marked MC3764-15. I upgraded three older CoCos and all chips checked OK on various memory checks. The chips were purchased from Alpha Labs, 2302 Oakland Gravel Road, Columbia, MO 65202. Just wanted to pass along this information to other readers. At that price, there is no excuse for only 16 or 32K.

Les Green
Jefferson City, MO

Patch From the Past

Editor:

With the publishing of Colin Stearman's "Getting on the Right Track" in your July 1985 issue, many readers may benefit from this patch to Roger Schrag's "More Powerful Backup Utility" (RAINBOW, December 1983). To format and back up 40 tracks rather than 35, change lines 88 and 377 of the source code listing to `CMPA #$28`. Or, if you used the same ORG as the source listing, you can load the assembled program and `POKE &H11E8,40: POKE &H14C7,40`.

If you want an option to exit the program, add the label K1 to Line 265, then add these lines immediately above it (with *EDTASM+* you will have to renumber):

```
CMPA  #3
BLO   K1
CLR   $71
JMP   $A027
```

With this change you can use BREAK to return to BASIC anytime the program asks for input.

Fred Sawtelle
Huntsville, TX

Free Granules on Display

Editor:

My compliments to your magazine for the information given and the knowledge that one can gain from addiction to it and RAINBOW ON TAPE.

Here's an addition that may be helpful on the *Hello* program in the August 1985 issue [Page 69], add Line 375 `PRINT @428, "FREE=";:PRINT@434,FREE(DN)`.

This will add a line to the screen indicating the free granules left on the disk.

Arthur Jones
Aurora, Ontario

Instant Color

Editor:

Here's a hint I'm sure will be of great assistance to CoCo-nuts everywhere. While most or all of us are now well familiar with the artifacted moire colors available to us in `PMODE4:SCREEN1,1`, I don't think many are aware of CoCo's ability to produce countless combinations *automatically*! That's right, 256 artifacted stripe patterns and colors that can even be `PAINT`ed.

Here's how it's done: `POKE` a number between zero and 255 into location 178 and immediately `PAINT(X,Y),,C` — the computer uses this location to store the color number, so by not specifying a paint color number you can force CoCo to use what is already found there. I have been able to produce every imaginable shade and tint. One thing to keep in mind here, though, is CoCo's irksome tendency to switch the artifacted red and blue shades almost arbitrarily. If care is taken in this regard, little problem should arise.

Does anyone know how I can `POKE` argyle? Write me at 111 East Condot Road, 15857.

John Petruna
St. Marys, PA

Save the Scoreboard!

Editor:

I received my RAINBOW today and dove right in. I start at the first page and go right through, only skipping the articles that are completely "Greek" to me.

In your article, "Building August's Rainbow" on Page 16 of the August 1985 issue, I was appalled to find that "Scoreboard Pointers" ranked at the very bottom [of your RAINBOWfest survey] and might get axed. For people like myself (and there are many),

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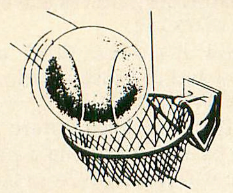

BASKETBALL STATISTICS

by Jeff Stevens

Coaches, let CoCo do the paperwork! Keeps each individual game, plus league, non-league and all game totals for a maximum of 16 players in up to 29 games. Stats can be kept in as many as 17 different categories — assists, steals, field goals, and free throw stats (made-attempted-percentages), offensive and defensive rebounds, turnovers, personal fouls, charges, playing time, quarters played and points. Totals for the opposition team and for your individual players are printable. Your season record and scores-to-date are available at any time. **Basketball Statistics** prints a year-end summary of each individual player on a game-by-game basis. Team stats for your team and the opponents' totals for the year are included. Menu driven — Easy to run — Excellent for most any basketball team.

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LONG DIVISION

by John Ashurst

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letters of *any* kind from readers are especially interesting. We are not into your "hi-tech" articles but would never ask you to ax them because there are also readers who know what they are about and look forward to information contained in them. I enjoy THE RAINBOW very much and this is just a plea from the "little guy" who has a computer for fun and games. Don't forget us!

R. Sinisi
Sarance Lake, NY

Editor:

I just read "Building August's Rainbow" and the part about "Scoreboard" possibly being "axed" out of THE RAINBOW. Don't even consider it! There are still lots of us that like it a lot and find it helpful in solving Adventure games and mastering arcade-style games . . . Please take this into consideration and thanks for the excellent CoCo magazine.

Chris Morris
Colonial Heights, VA

American Ingenuity

Editor:

I really enjoy RAINBOW magazine but I have a difficult time typing in all those exciting programs and games. I loved the "CoCo Unfurls Old Glory" salute by J.E. Borger on Page 113 in your July 1985 issue. For those readers who haven't typed it in, they could replace lines 270-760 with the following to save time, energy and memory.

```
10 FORX=10TO90STEP16
20 CIRCLE(X,10),5:CIRCLE(X,26),5:
CIRCLE(X,42),5:CIRCLE(X,58),5::
CIRCLE(X,74),5
30 NEXT
40 FORX=18TO82STEP16
50 CIRCLE(X,18),5:CIRCLE(X,34),5:
CIRCLE(X,50),5:CIRCLE(X,66),5
60 NEXT
```

This change eliminates a lot of work and seems to speed up the running of the program.

James A. Tatarka
Youngstown, OH

INFORMATION PLEASE

Editor:

Do you have a current list of active BBSs on the west coast?

Richard W. Harter
Santa Paula, CA

Editor's Note: See "Commlink" by R. Wayne Day on Page 61 of this issue for a current list of BBSs.

Editor:

My father has just brought home a Sharp PA-1000H portable Intelliwriter. It has an RS-232C parallel interface — 34-pin male. Has anyone experimented with this model, and what would be the most efficient way to adapt it to my CoCo? Write me at 5681 Goldfield Drive, 95123.

Andrea Wigglesworth
San Jose, CA

Editor:

In your 1984 Holiday issue [December] I ordered a muraphone MM-100 300 Baud mini modem out of the catalog in the magazine. Now that I have it, the Radio Shack stores say I need a program to make it work. Can you please help me find a program?

Donald Guy
Olympia, WA

Editor's Note: Any "terminal" program will accomplish what you need.

Saving the Penguins

Editor:

I am writing in regard to a game in your February 1985 issue [Page 33] titled "Louie Wants You to Join the Penguin Patrol," by Paul Wagorn.

My children have a 64K Extended BASIC Color Computer. On two different occasions we have entered the subject program into the computer; the program works fine. Our problem starts when we attempt to save the program on cassette tape. On every attempt we get an "out of string" error message. We have tried everything we could think of to no avail.

We are quite puzzled that the program works well but will not save. Since my children want to keep the program so much, I am turning to you in the hope you can advise me as to what the problem may be.

J.R. Gordley
Houston, TX

Editor's Note: Try typing `CLEAR 200`.

COBOL Compiler?

Editor:

I have a 32K Extended BASIC Color Computer with cassette drive and was wondering if a COBOL compiler is available for it. I haven't seen one advertised anywhere. I know it's available for the Radio Shack Model II, but why not for the Color Computer?

If anyone has information on where I might find a COBOL compiler for my CoCo, please write to me at 3-29 Rockway Cres., Canada K2G 0M3.

Jim Perkins
Nepean, Ontario

Lighting the Way

Editor:

I am wondering what type of lamp I should use on my computer desk. I have a desk that is built into a corner. My TV set is to my left on a shelf at eye level. Presently, I use a table lamp at my right, but it either glares in my eyes or on the TV screen. I have thought about replacing the lamp with either a clamp-on swing arm lamp or one that attaches to the wall in front of me. I've also considered a ceiling lamp or a floor model. I am interested in what others use. Please write to me at Rural Route, 50670.

As a former *Undercolor* subscriber, I am elated that THE RAINBOW will fulfill my subscription to the former, now that it has ceased publication. I can't think of a better replacement for *Undercolor*!

Lee Deuell
Shell Rock, IA

Editor:

I am in need of a low cost printer that can print out both graphics and near letter-quality characters for reports. I would appreciate hearing from anyone who could send me information about such a printer.

Also, can anyone tell me the difference between the JDOS and the Radio Shack DOS controllers? I would like to buy one of them, but I do not know which. Write to me at 6121 Nevada Avenue N.W., 20015.

Michael Carmody
Washington, D.C.

Editor's Note: The difference is in the abilities to use third party disk drives and the commands each allow. Read the ads in THE RAINBOW for more information.

Dragon Metamorphosis

Editor:

As a long term reader of your magazine I am greatly impressed. I have owned a Dragon 32 for the last year and a half. Since it is no longer being manufactured I had a local enthusiast convert the Dragon to accept most software available for the CoCo. It is 95 percent compatible while retaining the use of the parallel printer port.

I do have one question. Has anyone who has done a similar conversion found a way to use the parallel port with machine language programs such as the *VIP* series? Write to me at 122 Elma Street, Canada L2N 6A2.

Rich Davis
St. Catharines, Ontario

Not So Speedy

Editor:

As a marketer of software for the Color Computer, we have always been grateful for THE RAINBOW's strong stand against software piracy.

Recently, we were amazed to see a portion of one of our programs appear within a program printed in an article in RAINBOW. In the article "Rapid Reading" on Page 129 of the July 1985 issue, the calculation of reading speed on Line 160 is the same as lines 19 and 21 of the *Speed Reading* program that we have marketed since February 1984. The timing calculation contains six-digit numbers, so the agreement cannot be a coincidence.

Unfortunately, the program in that article misinterprets the calculation and gives an inaccurate value of reading speed. For example, when the user requests 200 words/minute, the text is displayed at only 120 words/minute.

For a speed reading program that really works, I refer your readers to Page 16 of that same July 1985 issue of RAINBOW.

Bernice Klein
B&B Software

SPECIFIC PROGRAM SEARCH

Editor:

I am 13 years old and would like to start my own BBS, but I don't know how. I was wondering if you can or recently have published any BBS programs?

J. Greg Colton
Phoenix, AZ

Editor's Note: We suggest you read two articles by Lane Lester — November 1983, Page 20, "Supreme SysOp and Magnificant Modem Master" and November 1984, Page 44, "Rainboard." Also, see the article, "CoBBS," on Page 135 of this issue.

Editor:

I am writing to inquire if any member of the CoCo Community is aware of learning programs for the CoCo that teach Chinese, either modern simplified characters or traditional characters. Any information would be greatly appreciated. Write to me at 377 Hamilton Street, 12210.

Steven Leibo
Albany, NY

Looking For Locksmiths

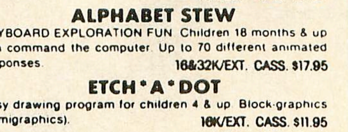
Editor:

Because I am a writer I get over 100 publications each year (sample copies to keep track of trends). *Publisher's Weekly*, *The Wall Street Journal* and RAINBOW are

triad pictures corp.
p o box 1299 sequim, wa 98382

REVIEWED IN THE JANUARY '85 ISSUE OF THE RAINBOW

THE ANIMATOR SERIES
Create your own FULLY ANIMATED CARTOONS!
"THE ANIMATOR certainly is a one-of-a-kind package. I've never seen something like this on any other home computer ...a very good buy for the CoCo." - **Ed Ellers, RAINBOW Technical Writer**
READ THE REVIEW IN JANUARY'S RAINBOW
NEW LOW PRICES!
THE ANIMATOR - Command a Hollywood style animation studio. 32 cels & 620 frames for over 1.5 min. of animation! Extensive manual & 3 cassettes. 32K/EXT. CASS. $29.95
ANIMATOR JR. - a simplified version in semigraphics. 16 cels, 500 frames (1.5 min. +). Animation can be called from your own BASIC program! 16K/EXT. CASS. $15.95



REVIEWED IN THE JUNE'85 ISSUE OF THE RAINBOW

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Children 3 & up learn letters & numbers. Each correct response adds another animated part to a smiling, dancing centipede. 16K/EXT. CASS. $17.95
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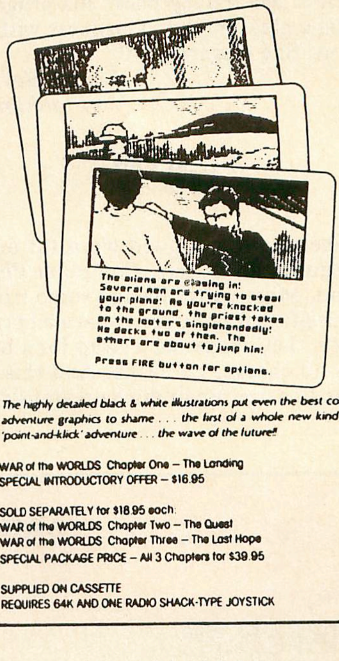
The aliens are closing in!
Several men are trying to steal your plane! As you're knocked to the ground, the priest takes on the looters singlehandedly! He decks two of them. The others are about to jump him!
Press FIRE button for options.

The highly detailed black & white illustrations put even the best color adventure graphics to shame . . . the first of a whole new kind of 'point-and-klick' adventure . . . the wave of the future!

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the only subscriptions I pay for. If I didn't find your magazine both useful and professionally done, I certainly wouldn't have it on such a tiny list.

I am trying to compile a list of programs specifically designed for the use of locksmiths. Any information from RAINBOW readers will be appreciated, especially any locksmith currently using a computer. Address correspondence to Box 99 RD #1, 15757.

John McCormick
Mahaffey, PA

BOUQUETS

Editor:

I buy a great deal of software through your ads. It is a pleasure to inform you when the support is behind the sale.

That is just the case with Lloyd E. Pulley, Sr., who authored *ROM-FREE* marketed by Prickly-Pear. I had a problem with the program and Mr. Pulley called me twice. Following that, he sent me an updated version plus another program for my trouble.

A reputable magazine has reputable advertisers in most cases, and RAINBOW is no exception. Mr. Pulley backs his programs, and it is a pleasure doing business with him and your fine magazine.

Emory Heyward
Franklin, TN

A Real Plus

Editor:

I'd like to put in a good word for one of your regular advertisers, Computer Plus of Littleton, Mass. After having some trouble with a malfunctioning serial-parallel printer interface, they suggested a swap for a better unit — no charge, no hassle. And this is in addition to a free repair done previously, not to mention tons of good advice on many items along the way. An A+ for Computer Plus.

Greg Erickson
Lowell, MA

Editor:

I would like to commend Cognitec for their speedy service. I ordered *Telewriter-64* on a Monday and received it the following Thursday. Who could ask for more?

As for *Telewriter-64*, it is an excellent program that everyone with a CoCo and printer should have.

Thanks Cognitec, and thanks to THE RAINBOW for a great magazine.

Clay Thompson
West Frankfort, IL

New Address

Editor:

Please advise your readership that the CoCo Freeware Clearinghouse has changed its name in conjunction with a move to a new location. Our new name and address is:

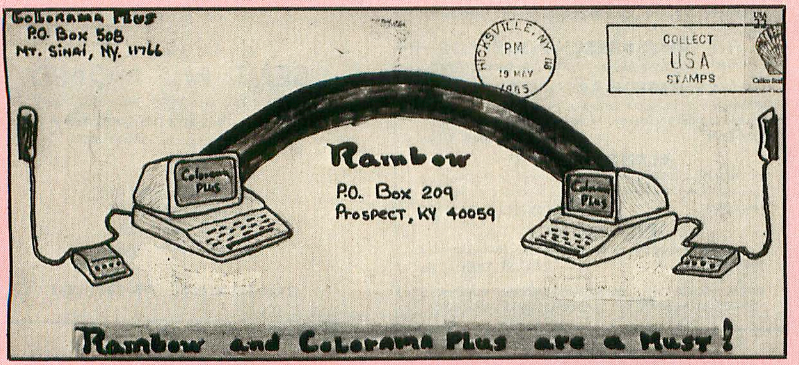
US*WARE!
P.O. Box 5811
Lompoc, CA 93436

Your readers can obtain more information on US*WARE! and our user-supported software by forwarding a self-addressed, stamped envelope and asking for either our Users or Authors Info-Paks.

Donald G. Barber, Jr.
*US*WARE!*

THE RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

ARTS AND LETTERS



Envelope of the Month

Colorama Plus
Mt. Sinai, NY

These Introductory Level stories are now available for TRS-80 Color Computers.

If you have a TRS-80 Color Computer with disk drive, the stories below offer the perfect introduction to the addictive pleasures of Infocom™ interactive fiction.

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In this fantasy story you start out as an ordinary mail clerk delivering a mysterious ransom note and end up – magic stone in hand – embarking on a series of whimsical adventures that take you to a destination beyond your wildest dreams.

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In this classic 1930's whodunit, a case of blackmail turns to murder before your eyes. You'll have to look for clues, question suspects, and analyze evidence to solve the case. If you live that long.

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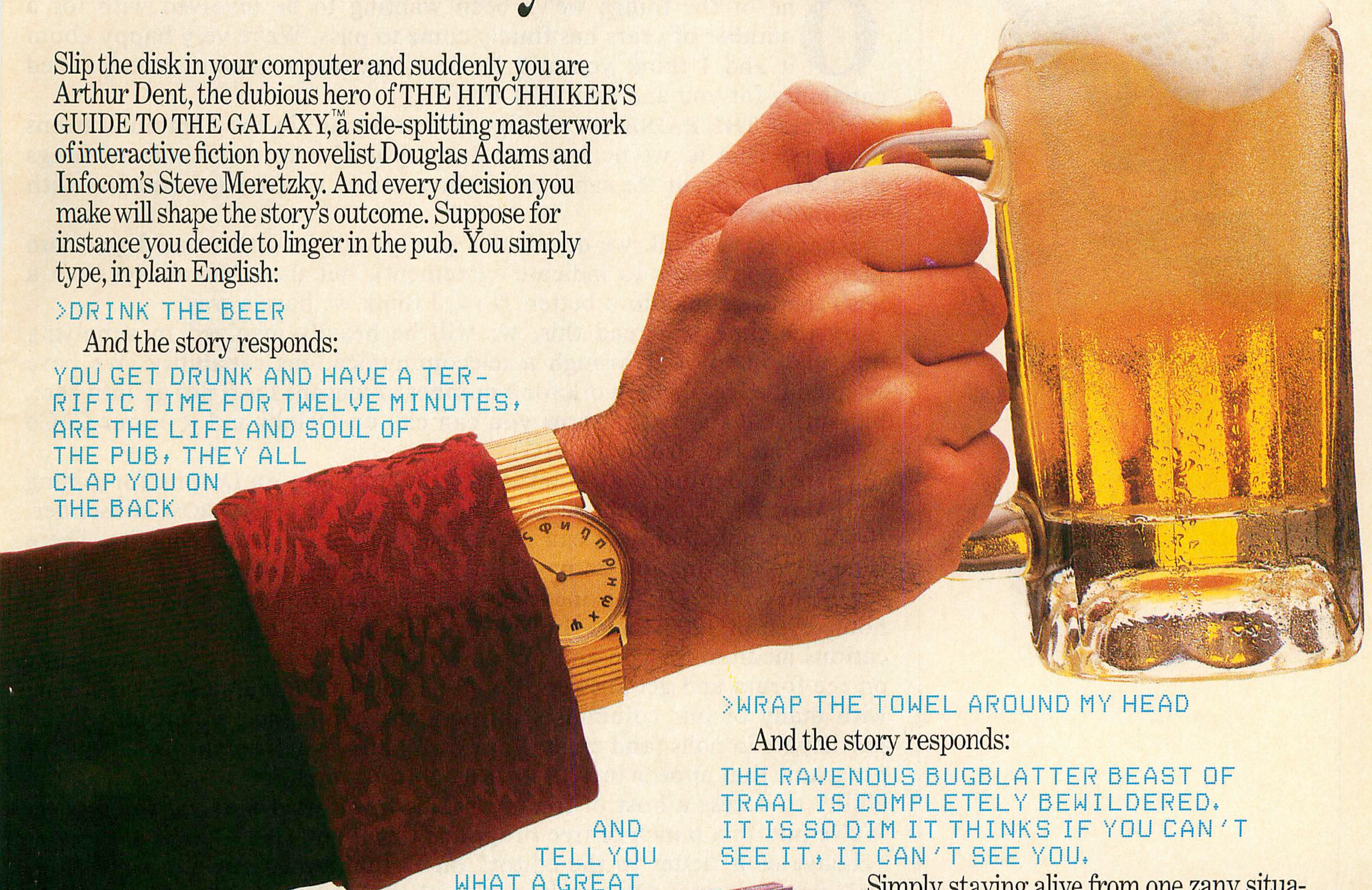
Call 1-800-262-6868 to order.
The TRS-80 Color Computer versions of these stories and the ones shown on the opposite page are not available in any store. Call toll-free to order yours now.

INFOCOM™

©1985 Infocom, Inc. WISHBRINGER is a trademark of Infocom, Inc. ZORK, PLANETFALL, The WITNESS, and INFIDEL are registered trademarks.

Earth will be destroyed in 12 minutes to make way for a hyperspace bypass.

Should you hitchhike into the next galaxy? Or stay and drink beer?



Slip the disk in your computer and suddenly you are Arthur Dent, the dubious hero of THE HITCHHIKER'S GUIDE TO THE GALAXY,™ a side-splitting masterwork of interactive fiction by novelist Douglas Adams and Infocom's Steve Meretzky. And every decision you make will shape the story's outcome. Suppose for instance you decide to linger in the pub. You simply type, in plain English:

```
>DRINK THE BEER
```

And the story responds:

```
YOU GET DRUNK AND HAVE A TER-
RIFIC TIME FOR TWELVE MINUTES,
ARE THE LIFE AND SOUL OF
THE PUB, THEY ALL
CLAP YOU ON
THE BACK
                                   AND
                              TELL YOU
                          WHAT A GREAT
                    CHAP YOU ARE AND
               THEN THE EARTH GETS
        UNEXPECTEDLY DEMOLISHED. YOU
WAKE UP WITH A HANGOVER WHICH LASTS
FOR ALL ETERNITY. YOU HAVE DIED.
```

Suppose, on the other hand, you decide to:

```
>EXIT THE VILLAGE PUB THEN GO NORTH
```

In that case you'll be off on the most mind-bogglingly hilarious adventure any earthling ever had.

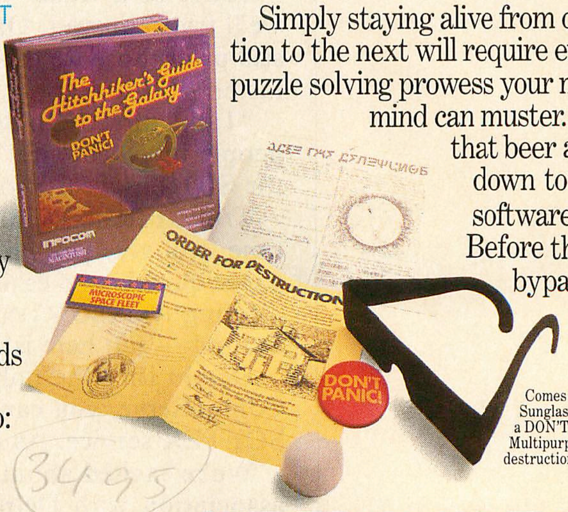
You communicate – and the story responds – in full sentences. So at every turn, you have literally thousands of alternatives. If you decide it might be wise, for instance, to wrap a towel around your head, just say so:

```
>WRAP THE TOWEL AROUND MY HEAD
```

And the story responds:

```
THE RAVENOUS BUGBLATTER BEAST OF
TRAAL IS COMPLETELY BEWILDERED.
IT IS SO DIM IT THINKS IF YOU CAN'T
SEE IT, IT CAN'T SEE YOU.
```

Simply staying alive from one zany situation to the next will require every proton of puzzle solving prowess your mere mortal mind can muster. So put down that beer and hitchhike down to your local software store today. Before they put that bypass in.



Comes complete with Peril Sensitive Sunglasses, a Microscopic Space Fleet, a DON'T PANIC Button, a package of Multipurpose Fluff and orders for the destruction of your home and planet.

The Hitchhiker's Guide to the Galaxy
ZORK I
ENCHANTER
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These and the Introductory Level stories on the opposite page are now available for TRS-80 Color Computers with disk drive.

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PRINT#-2,

One of the things we've been wanting to be involved with for a number of years has finally come to pass. We're very happy about it and I think you will be, too, because it means an expanded capability for you and your CoCo.

Here at THE RAINBOW, we figure that we are in the communications business. That is, we believe our primary goal is to communicate things to others; while, at the same time, allow others to share information with one another.

I happen to think we do all this pretty well (and the mail I get from many of you seems to indicate agreement), but there has always been a wish that we could do it better. Now, I think we have a way.

By the time you read this, we will be heavily involved in supplying information to you through a telecommunications capability. We have selected the Delphi network for a number of reasons I will not go into here, but suffice it to say that now you can call up Delphi and join our CoCo Special Interest Group (or SIG).

There is no initial cost — either for the first hour on Delphi, for joining Delphi or for joining the CoCo SIG — if you're a RAINBOW subscriber. If you are not, then you can subscribe and get the same benefits. There is detailed information on pages 26 and 27 of this issue.

Delphi connect time is inexpensive after your first free hour. Just $6 an hour, even at 1200 Baud. But best of all, it offers a two-way communications medium for you and for us. You'll be able to leave your questions on the forum and get answers; you'll be able to communicate in real time with many of our columnists through the conference; you'll be able to participate in polls (and create your own); and, you'll be able to download programs that appear in THE RAINBOW for a small fee *as well as* have the ability to access a host of free programs from other users of the service. We've put up a bunch of free programs to get you started.

Leave us a "letter to the editor" on Delphi. And, if it has a question, we'll try to answer. Or, maybe some other member of the SIG will. We'll still print those we think have wide appeal. But your answers should come faster.

"Talk" directly to Joe Kolar, Dick White, Jim Reed or a host of other people involved with THE RAINBOW! We'll post conference schedules on the SIG, but we'll also print preliminary schedules in the magazine itself.

Truly, I think Delphi opens a whole new world to us. And, for the first time, will give you an alternate way to obtain program listings from our pages quickly and easily — without having to type them in. Yes, we're still offering RAINBOW ON TAPE — and feel it is one of the biggest bargains around — but here is a way to get a single program, or a couple, quickly.

Delphi isn't the only outreach program we offer. In cooperation with CompuServe, you can still get listings from THE RAINBOW through their SOFTEX service. As at Delphi, there is a small cost here, too.

We're excited about the new things we will be doing because we see our association with Delphi and with CompuServe as an extension of THE RAINBOW. We especially hope you'll take advantage of (at least) the free

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
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- **Runs in 16K, 32K, or 64K**
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- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

...one of the best programs for the Color Computer I have seen...
— Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

RAINBOW
CERTIFICATION
SEAL

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

...truly a state of the art word processor... outstanding in every respect.
— The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

Cognitec
704 Nob Street
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Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add $2 for shipping. Californians add 6% state tax.

Now available at Radio Shack stores via express order

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hour of connect time on Delphi and "meet us" in person.

Everyone here at THE RAINBOW looks forward to hearing from you and sharing information with you. Tune us in and say "hello"!

* * *

The way I hear it, there will be some special things from Ft. Worth involving the CoCo during the upcoming holiday season. First out is a "media kit" that will go to writers and editors nationwide and will expand on the virtues of the Color Computer. This is more in the nature of public relations, but I applaud Tandy for its efforts to make sure that people who "cover" the computer business have their facts straight about our favorite computer.

There will be other things happening, too, from what I have been able to learn. And let's face the facts: There is only one *viable* home computer available today at a reasonable price — The CoCo.

I was reading a MacIntosh magazine the other day and saw an advertisement (two pages, four color) for the new Atari machine, which the industry is calling the "JackIntosh," after Jack Tramiel, the Atari president who recently moved there from Commodore.

Price? $795 with a black and white monitor — $995 with color. Priced way out of the CoCo range. For $995, I could get a new Color Computer, disk drives and a whole lot of software, too! I just don't see it for home or small business use. And, interestingly enough, the ad is selling on the basis of *price!*

With CoCo priced as it is, I cannot see buying Atari for a home or small business application. And we *know* the Color Computer has a wealth of computing power, software, hardware and a determined support base from its manufacturer. All these things are certainly worth pointing out to anyone you know who is thinking about buying a computer in the near future.

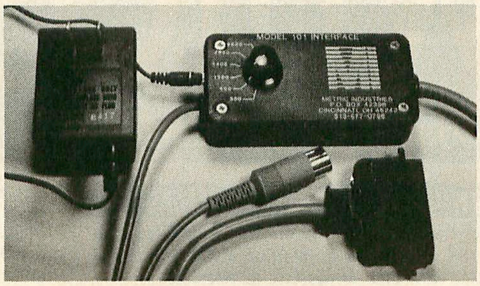
The Color Computer has "fought" Commodore, Atari, Apple, Sinclair and a host of other computers over the past years. Look who's left and still strong. Let's help Tandy spread the word and rally to our own battle cry: "CoCo Forever!"

— Lonnie Falk

Metric Industries

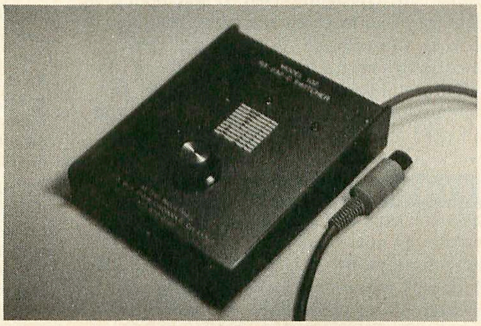
MODEL 101 INTERFACE ~~54.95~~ 49.50

The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). It comes with a "UL" listed power supply that can be unplugged from the interface if your printer supplies power (Most do). The 101 is only 4" x 2" x 1" and comes with all cables and connectors for your computer and printer.



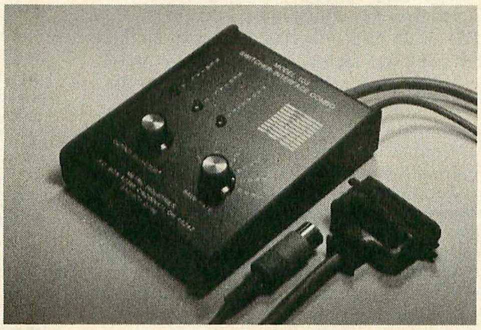
MODEL 102 SWITCHER 35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.



MODEL 103 COMBO ~~85.95~~ 73.50

With the turn of a knob the model 103 switches your computer's RS232C serial port to any one of 3 outputs — 2 serial and 1 parallel. The serial ports may be used for modems, serial printers or even another computer. The parallel port can be used with any Centronics compatible printer. The 103 has the best features from the 101 and 102: color coded position indicator lights, 6 switch selectable baud rates, heavy anodized aluminum cabinet, "UL" listed power supply and many more.



The Model 101, 102 and 103 will work with any level COCO basic, any memory size 4K-64K and are covered by a 180 day warranty.

The Model 101 and 103 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Gorillia, C.Itoth, Okidata and many others. They support basic print commands, word processors and graphic commands.

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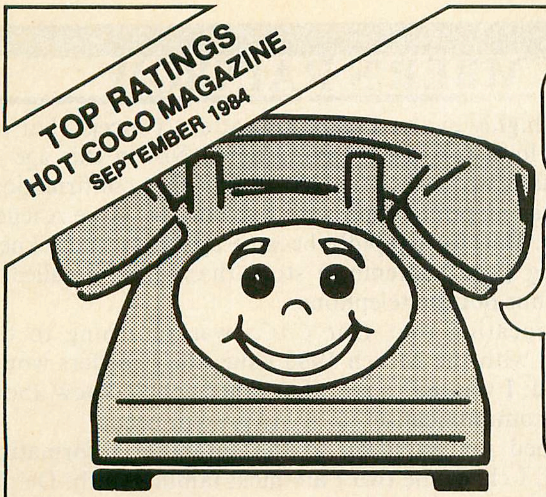

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BUILDING NOVEMBER'S RAINBOW

A monthly magazine is a highly evolved communications concept, but it's about the last place to look for fast-breaking news. Not in this age of telecommunications. That's why, when first the rumor, then confirmation, of a report that *Hot CoCo* is ceasing publication with its February issue reached me, I reached for the telephone. But, as it rapidly became apparent that I knew more about this still-developing (late September) story than those I called, I abandoned the telephone *calls*, but not the telephone.

You see, I was weary of repeating that *Hot CoCo* was returning to the mothership and that, beginning with the March 1986 issue, their readers would begin receiving *80 Micro* instead; I wanted to see what other people knew about it. There was a better means of communication to fit my present needs.

Switching to modem, I turned my attention to the computer information services. While there are several, I chose the two I am most familiar with: Delphi and CompuServe. Taking a shortcut past the familiar directories and menus, I headed directly for the CoCo and other Tandy-related SIGs (Special Interest Groups) to check the message boards, the information "grapevines" of the computer world. The news was out — the same information I had.

Importantly, since others already had reported what I knew, I didn't feel compelled to perform what had become a burdensome task of once again relating it. Rather, I simply "tuned in" to the areas I wanted without actively involving myself in any two-way interchange. Ham radio operators call it "reading the mail" when they listen in without transmitting; that bit of slang makes even more sense with computer information utilities since you are literally reading electronic messages right on your screen.

Of all the services offered by various "host" computer systems, from locally operated bulletin boards (similar to the complete BBS we're offering you in installments beginning in this Data Communications issue) to multifaceted, mainframe-based, national services, such as CompuServe and Delphi, the message boards are what I find most useful and informative — they're my major source of information on what's happening right now in the computer world.

Very likely, you, too, would come to relish scanning the questions novices ask, and learn from reading the answers veterans offer. You'd enjoy the rumors and the sermonettes, the information "leaks" and the personal opinions. The "soap box" editorials range from carefully worded mini-dissertations to unbridled and unabashed ranting and raving. Once you get the hang of things, you'll probably want to add your own two cents worth to a conversational "thread" on a controversial topic, but your first message is likely to be a question.

It's surprising to the uninitiated how quickly a technical question gets answered on a SIG. Someone may well fire an answer back to you in a matter of seconds. It may not be the person you addressed your open message to, but rather someone reading the mail who's crossed that bridge and wants to share the experience. Generally, a matter of hours, at most, will get the answer you need, no matter how esoteric the inquiry. It's immediate contact with other CoCo owners any time of day or night. No, a monthly magazine can't offer that kind of response time. This is one of the primary reasons why THE RAINBOW has elected to sponsor the new Color Computer SIG on Delphi — to facilitate the immediate interchange of information on our favorite machine and, in so doing, to bring the CoCo Community closer together.

In summary, if these printed words (the very last written for this monthly publication) are your first inkling that *Hot CoCo*, including its "Dr. ASCII" column, my personal favorite, is being merged back into *80 Micro*, then you need to join all of us who've begun hanging out on Delphi's new CoCo SIG, where this will be old news by the end of September. I'll leave the "post-mortems" and analysis of what losing this well-respected magazine competitor means to others. Rather, let me assure you that THE RAINBOW is within closer reach and more committed than ever to the CoCo Community, as evidenced by our sponsorship of Delphi's CoCo SIG. Check the full details on pages 26 and 27 explaining how present and future subscribers to THE RAINBOW can get a free, lifetime membership to Delphi just for the asking.

Until next time — which could be *tonight* on Delphi! — I invite you to keep following THE RAINBOW.

— Jim Reed

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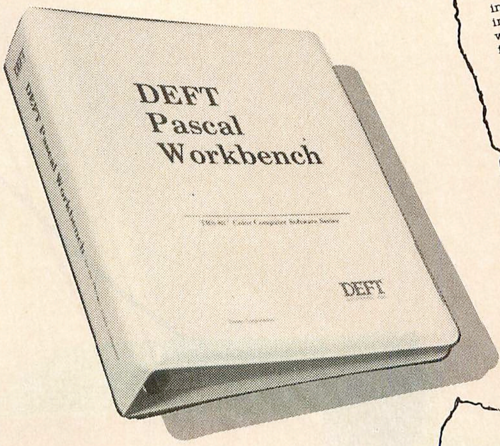

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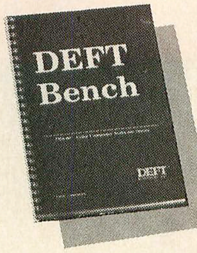

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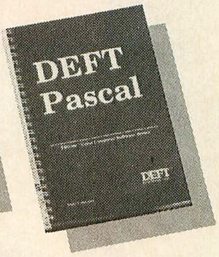

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HOT CoCo Magazine - (March 1985)

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RAINBOW Magazine - (November 1984)

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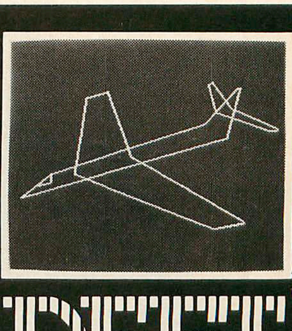

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Computer Trapshooting

By Richard W. Rutter

This Extended Color BASIC game simulates the real life sport of skeet shooting, in which each participant, using a shotgun, attempts to hit flying clay disks thrown from traps. This type of shooting is lots of fun, however, it tends to get fairly expensive if vigorously pursued. Our alternative, *Computer Trapshooting*, is both enjoyable and inexpensive. A 32K Color Computer and a set of joysticks are all that's needed.

Let's first discuss the game's objectives and how to play it. There are three play modes: "Singles," "International Singles" and "Doubles." Singles and International Singles are very similar except that in the latter, targets fly noticeably higher or lower, making it more difficult to hit them. With Doubles, you have to shoot at two targets instead of one.

One shot per target is allowed, and you must shoot before the target begins to fall or it will automatically be scored a miss (the real life game is more forgiving). Your score, the number of shots and the number of actual hits, is displayed and updated after each shot. For Singles and Doubles, you may choose any one of nine difficulty levels. In International Singles, the difficulty level will automatically be set at nine, the highest level.

The goal is fairly obvious: Try to hit as many targets as possible, and be able to do so at difficulty level nine. You will probably find Doubles the most challenging, but practice will be needed in order to master any of the three play modes.

The joysticks are very important. The right joystick is for shooter #1 and the left joystick is for shooter #2, if any. The firebutton fires the shot pattern. The gun sight with the small white bead in the middle is what you use to chase the targets. Using the joystick, the gun sight may be moved up, down, left or right. To launch the target, pull the joystick all the way down.

I recommend positioning the gun sight at the top center of the pill-box shaped trap house before launching the target so you'll be able to catch up with it. Practice using the joystick to manipulate the gun sight before actually attempting to shoot any targets. You may change the gun sight's picture by pressing 'S' — try it out. If you happen to shoot before the target is in motion, don't worry; each result is not scored until a target has been shot and broken, or it hits the ground.

When two shooters are playing, there are two sets of scores. The set at the bottom is always for shooter #1. The middle set is for shooter #2. Each

---

(Richard Rutter, formerly a free-lance programmer, works for a design and development company as a programming assistant. He holds a bachelor's degree in the social science field, but has worked with computers since 1981. Richard lives in New Castle, Del.)

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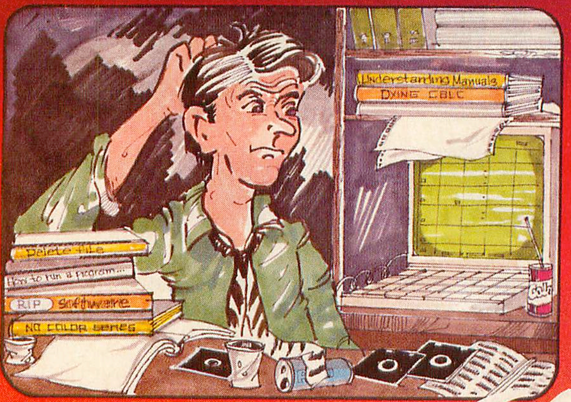

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player's turn can be determined by which "shot at" box is enclosed with an orange rectangle. The proper joystick responds only when it is the appropriate player's turn. You may find it more entertaining when competing with someone else.

You may return to the option menu before completing the current session by pressing SHIFT CLEAR. You are notified with both a sight and sound display when the current shooting session is complete. You then need to press SHIFT CLEAR to return to the option menu, as described.

It should be noted that *Computer Trapshooting* uses the `POKE 65495,0` option to double the execution speed. If your computer cannot operate at that speed, you need to remove the `POKE` commands and raise the octaves of the `PLAY` commands for proper sound effects.

The Graphics Display

A few more comments are needed about the graphics display. Note the green number in the middle of the trap house. This tells the number of targets you will need to shoot. Note the white number at the middle left. This number tells what difficulty level you are in, from L1 to L9. The difficulty level determines the likelihood of the targets coming out of the trap house at angles. At level one, all single targets come straight out. At level nine, many angled targets are likely. The white number at the middle right tells which play mode you are in, M1, M2 or M3.

Tips to Improve Your Score

Here are a few tips to help improve your scores. You need to react quickly after the target is thrown. To assure a hit, position the gun sight just below and at the center of the target. Press the firebutton and hold it down until the shot is fired. Be sure to continue moving the gun sight with the target or you'll probably shoot behind it.

When shooting Doubles, remember to release the firebutton after the first shot so you don't waste your second shot. Also, shoot the straight target first, then go after the angle target; it is much easier that way.

Program Structure

Finally, let's consider the program's structure. Although it can fit into a 16K cassette system, a 32K system is necessary to assure that it always runs properly. This is due to numerous `PPOINT` checks, which tend to gobble up memory bytes. If you have a 16K system and would still like to use *Computer Trapshooting*, you need to remove the Doubles play option and shorten the menus. At least 1,500 bytes must be removed in order to adapt the program to 16K. An easier way is to upgrade your computer to 32 or 64K — it is a worthy investment.

Here is a list of the variables used by the program. They are (in alphabetical order): A$, AF, AM, AT, BS, C, D, DL, DO, DS$, DT, G0, G1, G2, G3, G4, GS, H2, HC, HI, I, IN, J, LT, M, N, N$(0)-N$(9), N1, N2, N3, N4, ND, P, PF, R$, RA, S$, SA, SB, SC, SH, SP, SP$, T, T1, T2, T3, T4, T5, TC, TS, UM, X and Z. If you make additions to the program, in order to avoid needless problems, use variable names other than those found in the above list. Before loading the program, `PCLEAR4` to assure that your system is set up for graphics. Also, a `CLEAR200` will reserve ample space for it.

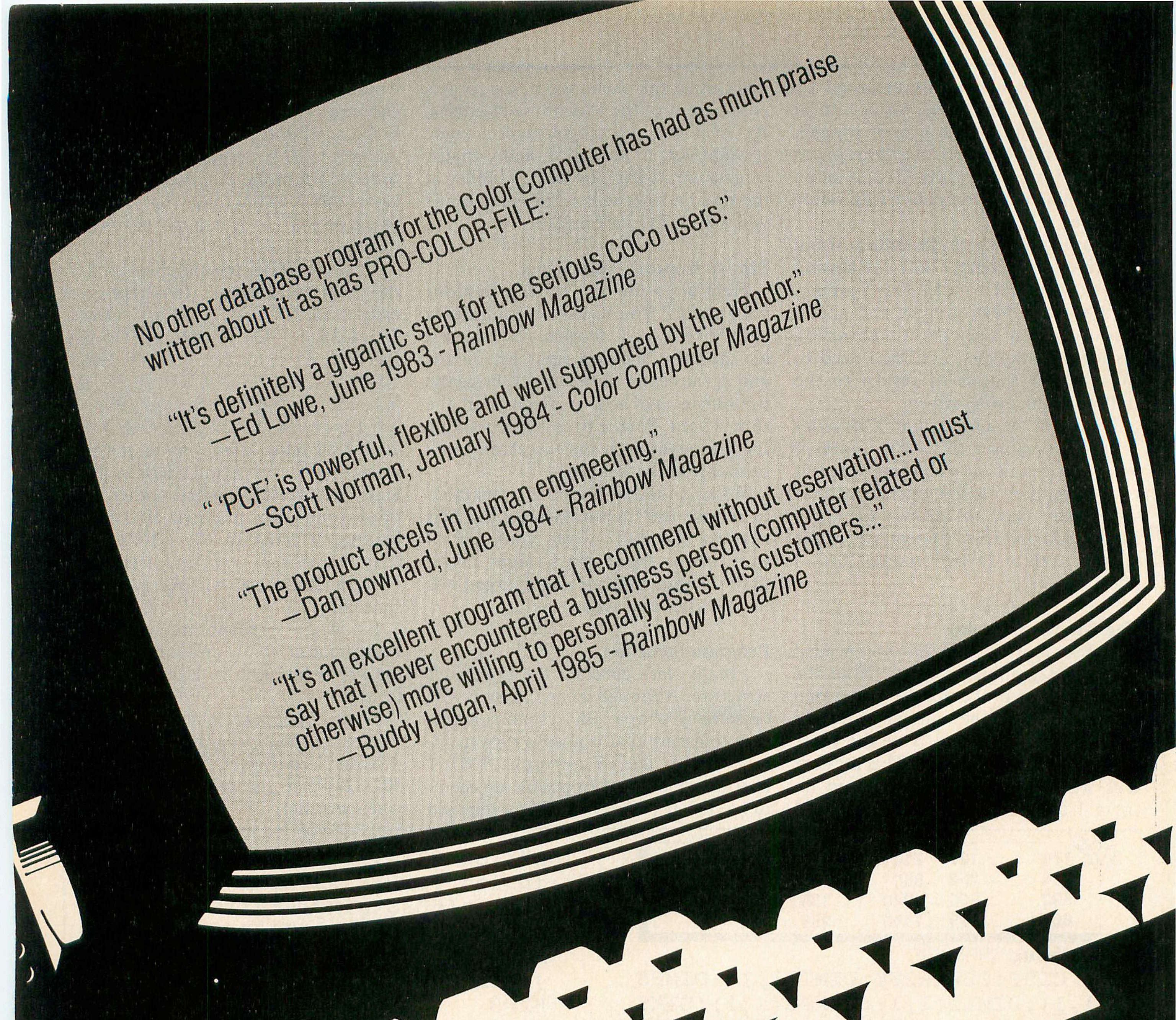
I now go trapshooting whenever I want, rain or shine, and it doesn't cost the proverbial arm or leg. You can do it, too!

(You may contact Richard with questions about this program at 205 Bacon Avenue, New Castle, DE 19720, phone 302-328-7325. Please include an SASE when writing.) ☐

170	127	710	106	1240	118
370	252	880	167	1400	239
500	206	1040	136	END	137
600	39	1140	255		

The listing: TRPSHOOT

```
10 CLS0:CLEAR200:DIMT(1,1):DIMBS
(1,1):DIMLT(1,1):DIMGS(1,1):DIMS
P(2,2):DIMSB(2,2):DIMDT(2,2):UM=
-4:G1=118:G2=114:G3=128:G4=110:D
S$=CHR$(128):POKE65495,0
20 N$(1)="BR2U6G2E2D6L2R4BR2"
30 N$(2)="BR2R4L6U2R4U4L4R4D4BD2
BR4"
40 N$(3)="R4U3L4R4U3L4R4D6BR2"
50 N$(4)="BR4U6D3L4U3D3R4BD3BR2"
60 N$(5)="R4U3L4U3R4BD6BR2"
70 N$(6)="R4U3L4D3U6D6R4BR2"
80 N$(7)="BR4U6L4D1U1R4D6BR2"
90 N$(8)="R4U3L4D3U6R4D6BR2"
100 N$(9)="BR4U6L4D3R4D3BR2"
110 N$(0)="U6R4D6L4BR6"
120 SP$="BR2"
130 PRINT@33,"richard"DS$"rutter
"DS$"welcomes"DS$"you"DS$"to";:S
CREEN0,1
140 PRINT@101,"computer"DS$"trap
shooting";:SCREEN0,1
150 PRINT@197,"your"DS$"selectio
n";:SCREEN0,1:PRINT@261,"1"DS$"s
ingles";:PRINT@325,"2"DS$"intern
ational"DS$"singles";:SCREEN0,1
160 PRINT@389,"3"DS$"doubles";:P
RINT@453,"4"DS$"end"DS$"program"
;:SCREEN0,1:IN=0:DO=0:RA=0:T5=0:
H2=0
170 A$=INKEY$
180 IFA$="1"THEN230
190 IFA$="2"THENIN=1:GOTO230
200 IFA$="3"THENDO=1:RA=2:GOTO23
0
210 IFA$="4"THEN1570
220 GOTO170
230 CLS0:IFDO=1THENPRINT@193,"en
ter"DS$"number"DS$"of"DS$"10"DS$
"pair"DS$"rounds";:GOTO250
240 PRINT@192,"enter"DS$"number"
DS$"of"DS$"25"DS$"target"DS$"rou
nds";:SCREEN0,1
250 PRINT@302,"1-9";:SCREEN0,1
260 A$=INKEY$
270 IFVAL(A$)>0THEN290
280 GOTO260
290 IFND=1THENAF=VAL(A$):GOTO340
300 DL=VAL(A$)*25
310 IFDO=1THENDL=(DL*4)/5
320 IFIN=1THENAF=9:GOTO340
```



No other database program for the Color Computer has had as much praise written about it as has PRO-COLOR-FILE:

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"It's an excellent program that I recommend without reservation...I must say that I never encountered a business person (computer related or otherwise) more willing to personally assist his customers..."
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```
330 CLS0:PRINT@228,"enter"DS$"di
fficulty"DS$"level"DS$"1-9";:SCR
EEN0,1:IFND=0THENND=1:GOTO260
340 CLS0:PRINT@226,"enter"DS$"nu
mber"DS$"of"DS$"shooters"DS$"1-2
";:SCREEN0,1
350 A$=INKEY$:IFA$="1"THEN380
360 IFA$="2"THEN380
370 GOTO350
380 M=VAL(A$):IFPF=1THEN540
390 CLS0:PRINT@224,"ready"DS$"on
"DS$"the"DS$"left";:SCREEN0,1
400 PMODE3,1:PCLS7
410 DRAW"C8BM110,151U20R50D20L50
H15U20F15R50H15L46BD20BL2L98BR16
0R95"
420 PAINT(105,130),6,8:PAINT(130
,145),6,8:PAINT(125,125),6,8
430 CIRCLE(130,175),70,8,.15,.01
,.5:CIRCLE(130,165),50,8,.15,.01
,.5
440 DRAW"C8":LINE(60,175)-(80,16
5),PSET:LINE(200,175)-(180,165),
PSET
450 PAINT(75,173),5,8
460 LINE(85,182)-(103,170),PSET:
LINE(113,183)-(123,173),PSET:LIN
E(145,184)-(141,172),PSET:LINE(1
77,182)-(163,170),PSET
470 PAINT(5,180),6,8
480 CLS0:PRINT@238,"ready"DS$"on
"DS$"the"DS$"right";:SCREEN0,1
490 DRAW"C8BM50,50U2R3U1R3D1R3D2
L6":PAINT(53,49),8,8:DRAW"C6R6":
GET(50,50)-(56,46),T:PAINT(53,49
),7,7:GET(50,50)-(56,46),BS
500 DRAW"C8BM50,50U1R3U1R3D1R3D1
C6L8":GET(50,50)-(56,46),LT:PUT(
50,50)-(56,46),BS
510 FORX=1TO10:CIRCLE(50+X,49),3
,6,.9:CIRCLE(50+X,50),2,6,.9:NEX
TX:PSET(55,47,5):PSET(55,46,5):G
ET(50,50)-(60,46),GS:PAINT(55,49
),7,7:PUT(G1,G2)-(G3,G4),GS
520 FORX=1TO15:PSET(RND(16),RND(
14),6):NEXTX:GET(0,14)-(16,0),SP
:DRAW"C7":LINE(0,14)-(30,0),PSET
,BF:GET(0,14)-(16,0),SB
530 DRAW"C8":FORX=1TO10:PSET(RND
(16),RND(10),8):NEXTX:FORX=1TO5:
PSET(RND(16),RND(10),6):NEXTX:GE
T(0,10)-(16,0),DT:DRAW"C7":LINE(
0,10)-(30,0),PSET,BF
540 DRAW"C7":LINE(10,150)-(34,14
0),PSET,BF
550 CLS0:PRINT@229,"ready"DS$"on
"DS$"the"DS$"firing"DS$"line";:S
CREEN0,1
560 PF=1:GOSUB1150
570 DRAW"C5BM14,148U6D6R4BR4":SC
=AF:GOSUB1170
580 DRAW"C5BM6,177U8D4R6U4D8BR8U
8L2R4L2D8L2R4BR10U8L4R8":DRAW"BM
215,165R4U4L4U4R4BD8BR4U8D4R6U4D
8BR4U8R6D8L4R4BR8U8L4R8BD22BL32U
5E5R1F5D1L9R9D4BR10U10L5R11"
590 DRAW"C5":LINE(120,146)-(150,
136),PSET,BF:DRAW"C6BM120,144":S
C=DL:GOSUB1170
600 DRAW"C7":LINE(219,150)-(245,
140),PSET,BF:DRAW"C5BM223,149U6F
4E4D6BR5"
610 IFDO=1THENDRAWN$(3):GOTO640
620 IFIN=1THENDRAWN$(2):GOTO640
630 DRAWN$(1)
640 IFM=2THENTC=1:PF=1:GOSUB1150
ELSEPAINT(170,157),6,6:PAINT(45,
157),6,6
650 N1=0:N2=1:N3=126:N4=254:TC=0
660 PLAY"T10L10V31O3;12;11;10;9;
8;7;6;5;4;3;2;1T255L255":SCREEN1
,1
670 IFTS=DL THENIFM=1THEN1040ELS
EIFT5=DL THEN1040
680 A$=INKEY$:D=JOYSTK(0):I=JOYS
TK(N1):J=JOYSTK(N2):P=PEEK(65280
)
```

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```
690 IFA$=CHR$(92)THEN1060
700 IFA$="S"THENDRAW"C7":LINE(G1
+G0,G4+1)-(G1+G0,G4),PSET:DRAW"C
5":G0=G0+1:IFG0>3THENG0=-2:LINE(
G1+G0,G4+1)-(G1+G0,G4),PSET:GET(
G1,G2)-(G3,G4),GS ELSELINE(G1+G0
,G4+1)-(G1+G0,G4),PSET:GET(G1,G2
)-(G3,G4),GS
710 IFI<15THENIFG1>=16THENPUT(G1
,G2)-(G3,G4),BS:G1=G1-16:G3=G3-1
6
720 IFI>55THENIFG3<=243THENPUT(G
1,G2)-(G3,G4),BS:G1=G1+16:G3=G3+
16
730 IFJ<20THENIFG4>34THENPUT(G1,
G2)-(G3,G4),BS:G2=G2-7:G4=G4-7
740 IFJ>40THENIFG2<114THENPUT(G1
,G2)-(G3,G4),BS:G2=G2+7:G4=G4+7
750 PUT(G1,G2)-(G3,G4),GS
760 IFJ=63THENIFPF=0ANDDO=0THENP
F=1:GOSUB900ELSEIFPF=0THENPF=1:S
A=1:AT=1:GOSUB1270
770 IFP=N3 ORP=N4 THENIFSH=0ANDD
O=0THENPLAY"O1;1;2;3;4;1;2;3;4":
SH=1:GOSUB1110ELSEIFRA>0THENPLAY
"O1;1;2;3;4;1;2;3;4":RA=RA-1:GOS
UB1380
780 IFPF=0THEN680
790 IFDO=1THEN840
800 PUT(T1,T2)-(T3,T4),BS
810 IFT1<=8ORT3>=244ORT4<34THENP
UT(G1,G2)-(G3,G4),BS:SH=0:GOTO10
20
820 T1=T1+AM:T3=T3+AM:T2=T2+UM:T
4=T4+UM:PUT(T1,T2)-(T3,T4),T
830 GOTO680
840 PUT(118,T2)-(124,T4),BS
850 PUT(T1,T2)-(T3,T4),BS
860 IFT1<=8ORT3>=244ORT4<=34THEN
PUT(G1,G2)-(G3,G4),BS:GOTO1460
870 T1=T1+AM:T3=T3+AM:T2=T2+UM:T
4=T4+UM:IFAT=1THENPUT(T1,T2)-(T3
,T4),T
880 IFSA=1THENPUT(118,T2)-(124,T
4),T
890 GOTO680
900 N=RND(AF):ONN GOTO920,910,93
0,940,950,960,970,980,990
910 T1=102:T3=108:AM=-8:GOTO1000
920 T1=118:T3=124:AM=0:UM=-4:GOT
O1010
930 T1=130:T3=136:AM=8:GOTO1000
940 T1=114:T3=120:AM=8:GOTO1000
950 T1=118:T3=124:AM=-8:GOTO1000
960 T1=110:T3=116:AM=-8:GOTO1000
970 T1=138:T3=144:AM=8:GOTO1000
980 T1=134:T3=140:AM=12:GOTO1000
990 T1=98:T3=104:AM=-12
1000 IFIN=1THENUM=RND(5)*-1
```

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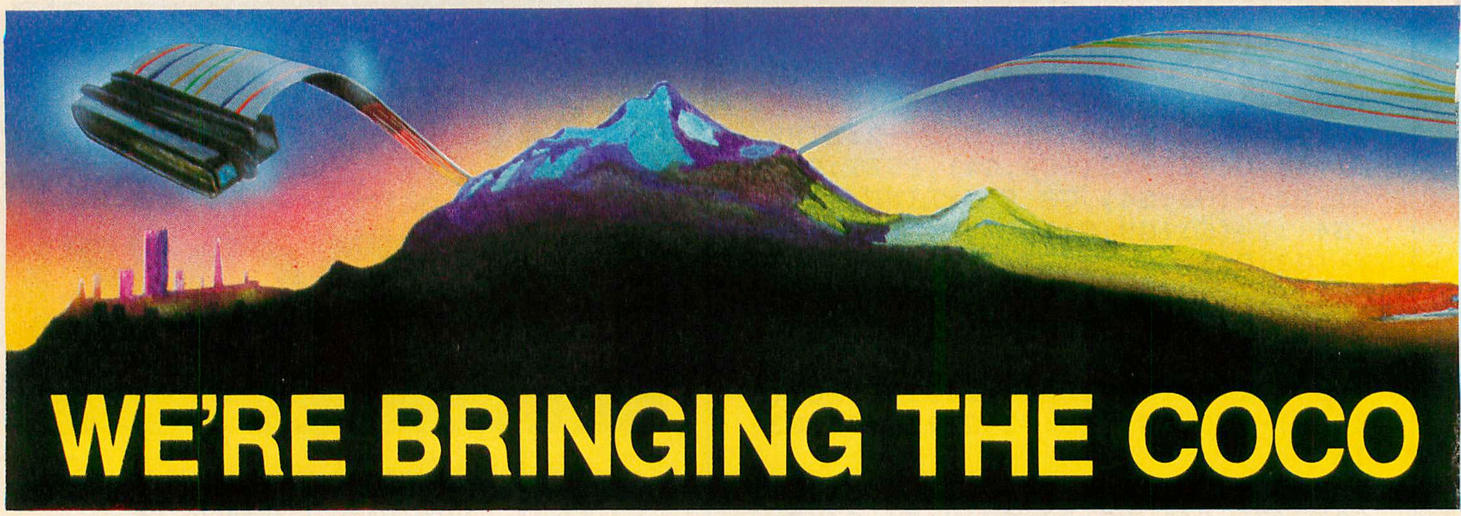

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The CoCo Special Interest Group (SIG) features a variety of services, including an open forum where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

PEEK INTO THE RAINBOW

The CoCo SIG's conference feature allows you to meet electronically with other members of the CoCo Community. You can join conferences with notables such as Fred Scerbo, Dan Downard, Ed Ellers, Lonnie Falk, Dick White, Tony DiStefano and others — on a regular basis. Conference schedules will appear in THE RAINBOW each month. Be sure to check online announcements for changes and additions.

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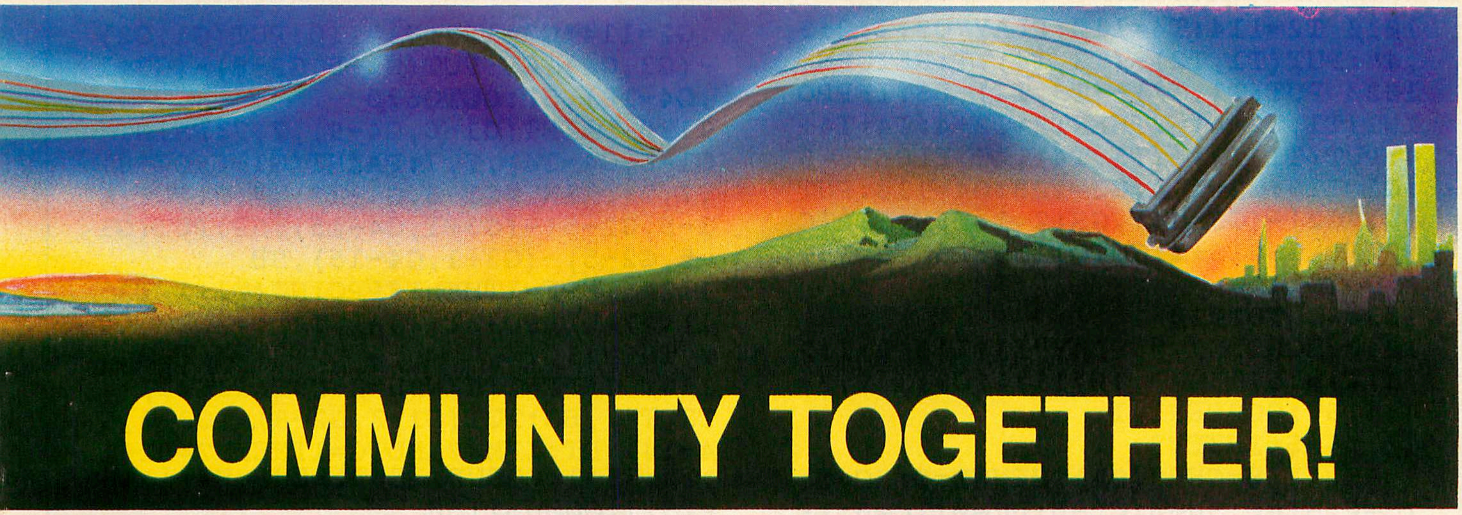

COMMUNITY TOGETHER!

How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks, like Uninet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use (there is no charge for any of them, unless you have to make a long-distance call) and follow the instructions below:

On Uninet: Call (800) 821-5340 to get the Uninet number for your area. After you call the appropriate number for your own area and make connection, you'll see a prompt of "L?" Press ENTER, the period key (.) and ENTER again. At the "service:" prompt, type `GVC` (for General Videotex Corporation) and ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type `DELPHI` and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud), type `SET 2:1, 3:126` and press ENTER. Now type `p 1 3106, DELPHI;` and press ENTER.

From other countries: Many countries have their own data networks that can connect to either Uninet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 312561703088 through Uninet, or 310600601500 through Tymnet. (You'll have to pay the toll charges for this connection.)

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If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type `RAINBOWSUB` and press ENTER. At the "PASSWORD:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

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If you make a typing error, just press ENTER and start over. Remember that at any point, when you're on Delphi, you can type `HELP` to get help on how to use the system. To get off the system just type `BYE`.

Come Visit Us! Type: `GROUP COCO`

After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password. No time is assessed against your free hour of service while you answer these questions.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen user name and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it. Again, there is *no charge* for the time you spend configuring your account. Your hour of free time starts after Max bids you goodbye.

You'll wind up at the Delphi Main Menu; type in `GROUP COCO` and **join us on the CoCo SIG!**

```
1010 T2=114:T4=110:PLAY"O3;1;2;3
;4":PUT(T1,T2)-(T3,T4),T:RETURN
1020 PUT(T1,T2)-(T3,T4),BS:IFPPO
INT(T1,T2+4)=7THENT2=T2+4:T4=T4+
4:PUT(T1,T2)-(T3,T4),LT ELSEPF=0
:G1=118:G2=114:G3=128:G4=110:PUT
(G1,G2)-(G3,G4),GS:Z=1:IFM=1ORTC
=0THENTS=TS+1:GOTO1150ELSET5=T5+
1:GOTO1150
1030 GOTO1020
1040 SCREEN1,0:PLAY"T10L10O2;1;2
;3;4;5;6;7;8;9;10;11;12O3;1;2;3;
4;5;6":SCREEN1,1
1050 A$=INKEY$
1060 IFA$=CHR$(92)THENND=0:SC=0:
TS=0:HI=0:SH=0:CLS0:HC=0:TC=0:IF
PF=1THENPUT(118,T2)-(124,T4),BS:
PUT(T1,T2)-(T3,T4),BS:GOTO130ELS
EPF=1:GOTO130
1070 GOTO1050
1080 IFT2<134THENT2=T2+2:T4=T4+2
:PUT(T1,T2)-(T3,T4),LT ELSEPF=0:
G1=118:G2=114:G3=128:G4=110:PUT(
G1,G2)-(G3,G4),GS:Z=1:TS=TS+1:GO
TO1150
1090 GOTO1050
1100 PUT(G1-5,G2-8)-(G3+1,G4-18)
,SB:PUT(G1,G2)-(G3,G4),BS:G1=118
:G2=114:G3=128:G4=110:PUT(G1,G2)
-(G3,G4),GS:PUT(G1-5,G2-8)-(G3+1
,G4-18),SB:GOTO670
1110 PAINT(G1-6,G4-9),7,7:PAINT(
G1-6,G4-14),7,7:PAINT(G1-6,G2-8)
,7,7:PAINT(G1-6,G4-13),7,7:PUT(G
1-5,G2-5)-(G3+1,G4-15),SP:PUT(G1
-5,G2-5)-(G3+1,G4-15),SB
1120 IFPF=1THENIFPPOINT(T1+1,T2-
1)<>7ANDPPOINT(T3-1,T2)<>7ORG4<T
2 THEN1100
1130 IFPF=1THENSH=0:PUT(T1,T2)-(
T3,T4),BS:PUT(G1-3,G2-8)-(G3+3,G
4-14),DT:IFM=2ANDTC=1THENH2=H2+1
:T5=T5+1:GOSUB1150ELSEHI=HI+1:TS
=TS+1:GOSUB1150
1140 SH=0:GOTO1100
1150 DRAW"C7":IFM=2ANDTC=1THENLI
NE(164,161)-(204,151),PSET,BF:DR
AW"C8":LINE(215,191)-(255,181),P
SET,B:DRAW"C5BM166,159":SC=T5:N1
=0:N2=1:N3=126:N4=254:GOTO1170
1160 SC=TS:LINE(215,191)-(255,18
1),PSET,BF:DRAW"C5BM217,189":IFM
=2THENN1=2:N2=3:N3=125:N4=253:DR
AW"C8":LINE(164,161)-(204,151),P
SET,B:DRAW"C5BM217,189"
1170 S$=STR$(SC)
1180 FORC=1TOLEN(S$)
1190 R$=MID$(S$,C,1)
1200 N=ASC(R$):IFN>47THENDRAWN$(
N-48)ELSEDRAWSP$
1210 DRAWSP$:NEXTC
1220 IFZ=1THENZ=0:IFM=1THEN670EL
SEIFTC=0THENTC=1:GOTO670ELSETC=0
:GOTO670
1230 IFM=2THENIFPF=1ANDTC=1THENP
F=0:DRAW"C7":LINE(40,161)-(80,15
1),PSET,BF:DRAW"C5BM42,159":SC=H
2:GOTO1170
1240 IFPF=1THENPF=0:DRAW"C7":LIN
E(0,191)-(40,181),PSET,BF:DRAW"C
5BM2,189":SC=HI:GOTO1170
1250 IFM=2THENTC=TC+1:IFTC>1THEN
TC=0
1260 UM=-4:RETURN
1270 N=RND(AF):ONN GOTO1280,1310
,1300,1290,1320,1330,1340,1350,1
360
1280 T1=130:T3=136:AM=8:GOTO1370
1290 T1=138:T3=144:AM=8:GOTO1370
1300 T1=94:T3=100:AM=-8:GOTO1370
1310 T1=102:T3=108:AM=-8:GOTO137
0
1320 T1=110:T3=116:AM=-12:GOTO13
70
1330 T1=126:T3=132:AM=12:GOTO137
0
1340 T1=110:T3=116:AM=-12:UM=-6:
```

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```
GOTO1370
1350 T1=126:T3=132:AM=12:UM=-6:G
OTO1370
1360 T1=138:T3=144:AM=12:UM=-6
1370 T2=114:T4=110:PLAY"O3;1;2;3
;4":PUT(T1,T2)-(T3,T4),T:PUT(118
,T2)-(124,T4),T:RETURN
1380 PAINT(G1-6,G4-9),7,7:PAINT(
G1-6,G4-14),7,7:PAINT(G1-6,G2-8)
,7,7:PAINT(G1-6,G4-13),7,7:PUT(G
1-5,G2-5)-(G3+1,G4-15),SP:PUT(G1
-5,G2-5)-(G3+1,G4-15),SB
1390 IFSA=1ANDG4>T2 THENIFPPOINT
(119,T2-1)=7ORPPOINT(123,T2)=7TH
ENPUT(118,T2)-(124,T4),BS:PUT(G1
-3,G2-8)-(G3+3,G4-14),DT:SA=0:HC
=HC+1:PUT(G1-3,G2-8)-(G3+3,G4-14
),SB:IFM=2ANDTC=1THENT5=T5+1:H2=
H2+1ELSEHI=HI+1:TS=TS+1
1400 IFAT=1ANDG4>T2 THENIFPPOINT
(T1+1,T2-1)=7ORPPOINT(T3-1,T2)=7
THENPUT(T1,T2)-(T3,T4),BS:PUT(G1
-3,G2-8)-(G3+3,G4-14),DT:AT=0:HC
=HC+1:PUT(G1-3,G2-8)-(G3+3,G4-14
),SB:IFM=2ANDTC=1THENH2=H2+1:T5=
T5+1ELSEHI=HI+1:TS=TS+1
1410 IFRA=0ANDHC=2THENRA=2:HC=0:
GOSUB1150
1420 IFPF=0THENRA=2
1430 IFPF=0THENPUT(G1,G2)-(G3,G4
),BS:G1=118:G2=114:G3=128:G4=110
:PUT(G1,G2)-(G3,G4),GS
1440 IFTS=DL THENIFM=1THEN1040EL
SEIFT5=DL THEN1040
1450 RETURN
1460 PUT(T1,T2)-(T3,T4),BS:IFSA=
1THENPUT(118,T2)-(124,T4),BS
1470 T2=T2+4:T4=T4+4:IFT2>=136TH
EN1520
1480 IFSA=1THENIFT2>=116THENSA=0
:IFM=1ORTC=0THENTS=TS+1ELSET5=T5
+1
1490 IFAT=1THENPUT(T1,T2)-(T3,T4
),LT
1500 IFSA=1THENPUT(118,T2)-(124,
T4),LT
1510 GOTO1460
1520 IFAT=1THENAT=0:IFM=1ORTC=0T
HENTS=TS+1ELSET5=T5+1
1530 IFHC=0THENZ=1:PF=0
1540 G1=118:G2=114:G3=128:G4=110
:PUT(G1,G2)-(G3,G4),GS:HC=0:RA=2
1550 GOSUB1150
1560 GOTO670
1570 POKE65494,0:CLS:PRINT@6,"US
ER ENDED PROGRAM.":END
```

SUPPORT:

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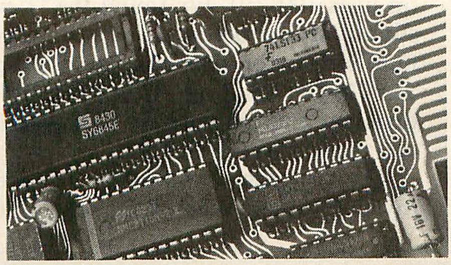

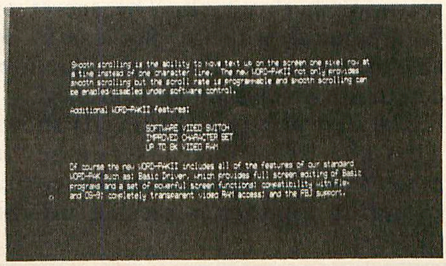

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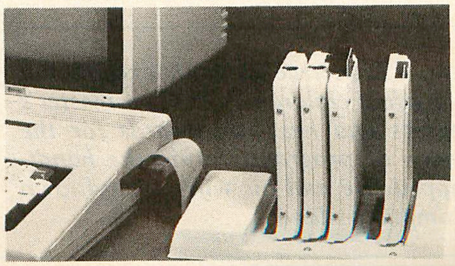

EDUCATION NOTES

16K
ECB

Working With The Electronic Book

Part 1

By Steve Blyn
Rainbow Contributing Editor

This month we will present the first of a two-part series on Radio Shack's Electronic Learning Book. It is one of the newer peripherals Radio Shack has produced for the Color Computer. We think it can be a very valuable educational tool.

As in the case of several other Radio Shack peripherals, the Electronic Book comes with no documentation. I don't know what the reason behind this is, but it is not the first time. The original X-Pad was equipped with no documentation or software, and the Touch-Pad, similarly, arrived nude.

There are software packages available for the Electronic Book (the ones I've seen are very enjoyable) and these do include documentation. The price of a package is close to the price of the book. I'm sure many potential buyers of the Book will probably like to create programs for it to add to their purchased collection. It is our intent to help RAINBOW readers write programs for the Electronic Book; it is an interesting piece of hardware that should not be overlooked due to lack of user instructions.

Now for the good news. The Book is a wonderful idea and a pleasure to use. This month's column includes two programs. The first demonstrates what the Electronic Book does; the second is a simple number-matching game for preschoolers. Next month, we will go into programs for older children. In order to use the programs, an Electronic Book must be used.

In case you've never seen one, the Electronic Book is a loose-leaf notebook. The inside has a full-size vinyl page with huge numbers from one to 12 imprinted on the vinyl. The idea is for the child to touch a number to give a response. The Book comes with a cable that plugs into the right joystick port. A different joystick value is issued each time one of the numbers in the Book is pressed. Wires underneath the vinyl accomplish this task. The secret of programming with the Book is to be able to read these values and, therefore, determine which number is pressed.

The first program (Listing 1) shows what the Book does. A number is pressed in the Book, and the corresponding number is circled on the replicated screen version of the Book's vinyl page.

Following is a table of the joystick values that are emitted when each number is pressed. `JOYSTK(0)` tells us what the X-coordinate reading is and `JOYSTK(1)` is the Y-coordinate value.

JOYSTK(0) Value	JOYSTK(1) Value	Number Pressed
63	0	1
53	0	2
41 or 42	0	3
8	0	4
19	0	5
30	0	6
0	63	7
0	52	8
0	40	9
0	7	10
0	18	11
0	28	12

These values are listed in the program on lines 100-210. We found the '3' was slightly temperamental and needed two numbers to be checked for a proper `JOYSTK(0)` reading. This presents no problem and may merely be a glitch in our models of the CoCo.

The program continually scans the joystick values. When it makes a match

---

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He and his wife, Cheryl, own Computer Island.)

to the table listed, it responds with some music and circles the number pressed.

The second of this month's programs (Listing 2) is the number-matching exercise for preschoolers. A replica of the Book is drawn on the screen and a number is circled. The child presses the corresponding number on the pad. If correct, the number on the screen will be circled again in a different color. If incorrect, both the error and the correct answer will be shown.

We think the educational strength of this device is especially beneficial for preschoolers and physically handicapped students. Both of these populations often have motor dexterity problems and find it difficult to use the computer's keyboard.

This concept can be extended to many types of educational games, activities and learning situations. Next month, we will present an educational program on a slightly higher grade level to further illustrate the use of this new tool.

In conclusion, we issue a challenge to the more adventurous. We, at Computer Island, have begun to work with the Tandy 1000. Since some CoCo owners are also Tandy 1000 owners, we decided to try the Electronic Book on it. Although not designed for it, we have found that the Electronic Book works quite well on the Tandy 1000. We will leave it to you to determine what the necessary joystick values are for that computer. We will include our findings in next month's article. □

```
180 ......230
420 ......102
END ......70
```

Listing 1: ELECBOOK

```
10 REM"ELECTRONIC BOOK UTILITY"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,NY,1985
30 CLEAR2000
40 GOSUB 280
50 GOSUB 490
60 N=0
70 X=A:Y=B
80 A=JOYSTK(0)
90 B=JOYSTK(1)
100 IF A=63 AND B=0 THEN N=1:CIR
CLE(47,16),16,8,.7:DB$=E1$
110 IF A=53 AND B=0 THEN N=2:CIR
CLE(121,16),16,8,.7:DB$=E2$
120 IF A=41OR A=42 AND B=0 THEN
N=3:CIRCLE(197,16),16,8,.7:DB$=E
3$
130 IF A=8 AND B=0 THEN N=4:CIRC
LE(47,36),16,8,.7:DB$=E4$
140 IF A=19 AND B=0 THEN N=5:CIR
CLE(119,36),16,8,.7:DB$=E5$
150 IF A=30 AND B=0THENN=6:CIRCL
E(197,36),16,8,.7:DB$=E6$
160 IF A=0 AND B=63 THEN N=7:CIR
CLE(47,56),16,8,.7:DB$=E7$
170 IF A=0 AND B=52 THEN N=8:CIR
CLE(120,56),16,8,.7:DB$=E8$
180 IF A=0 AND B=40 THEN N=9:CIR
CLE(197,56),16,8,.7:DB$=E9$
190 IF A=0 AND B=7 THEN N=10:CIR
CLE(48,76),16,8,.7:DB$=E1$+E0$
200 IF A=0 AND B=18 THEN N=11:CI
RCLE(122,76),16,8,.7:DB$=E1$+E1$
210 IF A=0 AND B=28 THEN N=12:CI
RCLE(198,76),16,8,.7:DB$=E1$+E2$
220 IF N<1 THEN 80
230 COLOR5:LINE(160,97)-(200,120
),PSET,BF
240 DRAW"C7BM170,100"+DB$
250 COLOR4:LINE(150,120)-(188,11
6),PSET,BF
260 PLAY"O4L8CDEFGEC"
270 GOTO 50
280 REM"DRAWINGS FOR THE NUMBERS
 AND LETTERS NEEDED"
290 C$="BU4ER2FD2GL2HBG2BL4"
300 E$="BER3U2NL2U2L4BG5BL2"
310 H$="BUU2NU2R4NU2D2BGBL9"
320 O$="BEHU2ER2FD2GL2BGBL6"
330 S$="BU2FR2EHL2HER2FBG4BL6"
340 U$="BUU3ER2FD3BGBL9"
350 Y$="BUE2NU2F2BGBL9"
360 E0$=O$
370 E1$="BE2NU3DEBFBGBL9"
380 E2$="BENR3HER3U2L4BG5BL"
390 E3$="BENR3HENR2HER3BG5BL5"
400 E4$="BENU4E3L4BG4BL2"
410 E5$="BER4U2L3HER3BG5BL5"
420 E6$="BU2FR2EU2NHGL2HER2BG5BL
4"
430 E7$="BUNR4UE3BG5BL4"
440 E8$="BER2EHEHL2GFNR2GFBGBL6"
450 E9$="BER2EHL2GNFU2ER2FBG4BL6
"
460 SP$="BE4BUBG5BL5":'*SPACER
470 RETURN
480 REM"DRAW THE SCREEN"
490 PCLS:PMODE3,1:SCREEN1,1:PCLS
5
500 COLOR6:LINE(20,0)-(235,92),P
SET,B
510 LINE(24,2)-(231,90),PSET,B
520 PAINT(22,1),6,6
530 DRAW"A2S8C6BM50,10"+E1$
540 DRAW"BM125,10"+E2$
550 DRAW"BM200,10"+E3$
560 DRAW"BM50,30"+E4$:DRAW"BM125
,30"+E5$:DRAW"BM200,30"+E6$
570 DRAW"BM50,50"+E7$:DRAW"BM125
,50"+E8$:DRAW"BM200,50"+E9$
```

```
580 DRAW"BM45,70"+E1$+E0$
590 DRAW"BM120,70"+E1$+E1$:DRAW"
BM195,70"+E1$+E2$
600 DRAW"A2S8C7BM50,100"+Y$+O$+U
$+SP$+C$+H$+O$+S$+E$+SP$
610 RETURN
```

180 198
420 140
END 130

Listing 2: NMBRMTCH

```
10 REM"ELECTRONIC BOOK-MATCHING
NUMBERS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,NY,1985
30 CLEAR2000:CLS 4
40 XY=RND(-TIMER)
50 GOSUB 270
60 GOSUB 410
70 N=0
80 X=A:Y=B
90 A=JOYSTK(0)
100 B=JOYSTK(1)
110 IF A=63 AND B=0 THEN N=1:CIR
CLE(47,16),16,7,.7
120 IF A=53 AND B=0 THEN N=2:CIR
CLE(121,16),16,7,.7
130 IF A=41OR A=42 AND B=0 THEN
N=3:CIRCLE(197,16),16,7,.7
140 IF A=8 AND B=0 THEN N=4:CIRC
LE(47,36),16,7,.7
150 IF A=19 AND B=0 THEN N=5:CIR
CLE(119,36),16,7,.7
160 IF A=30 AND B=0THENN=6:CIRCL
E(197,36),16,7,.7
170 IF A=0 AND B=63 THEN N=7:CIR
CLE(47,56),16,7,.7
180 IF A=0 AND B=52 THEN N=8:CIR
CLE(120,56),16,7,.7
190 IF A=0 AND B=40 THEN N=9:CIR
CLE(197,56),16,7,.7
200 IF A=0 AND B=7 THEN N=10:CIR
CLE(48,76),16,7,.7
210 IF A=0 AND B=18 THEN N=11:CI
RCLE(122,76),16,7,.7
220 IF A=0 AND B=28 THEN N=12:CI
RCLE(198,76),16,7,.7
230 IF N<1 THEN 90
240 IF N=G THEN PLAY"O4L8CDEFGFE
DC"
250 IF N<>G THEN PLAY"G"
260 GOTO 60
270 REM"DRAWINGS FOR THE NUMBERS
```

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```
 AND LETTERS NEEDED"
280 E0$="BEHU2ER2FD2GL2BGBL6"
290 E1$="BE2NU3DEBFBGBL9"
300 E2$="BENR3HER3U2L4BG5BL"
310 E3$="BENR3HENR2HER3BG5BL5"
320 E4$="BENU4E3L4BG4BL2"
330 E5$="BER4U2L3HER3BG5BL5"
340 E6$="BU2FR2EU2NHGL2HER2BG5BL
4"
350 E7$="BUNR4UE3BG5BL4"
360 E8$="BER2EHEHL2GFNR2GFBGBL6"
370 E9$="BER2EHL2GNFU2ER2FBG4BL6
"
380 SP$="BE4BUBG5BL5":'*SPACER
390 RETURN
400 REM"DRAW THE SCREEN"
410 FOR T= 1 TO 2000: NEXT T:PCL
S:PMODE3,1:SCREEN1,1:PCLS5
420 COLOR6:LINE(20,0)-(235,92),P
SET,B
430 LINE(24,2)-(231,90),PSET,B
440 PAINT(22,1),6,6
450 DRAW"A2S8C6BM50,10"+E1$
460 DRAW"BM125,10"+E2$
470 DRAW"BM200,10"+E3$
480 DRAW"BM50,30"+E4$:DRAW"BM125
,30"+E5$:DRAW"BM200,30"+E6$
490 DRAW"BM50,50"+E7$:DRAW"BM125
,50"+E8$:DRAW"BM200,50"+E9$
500 DRAW"BM45,70"+E1$+E0$
510 DRAW"BM120,70"+E1$+E1$:DRAW"
BM195,70"+E1$+E2$
520 G=RND(12)
530 IF G=1 THEN CIRCLE(47,16),18
,8,.7:DB$=E1$
540 IF G=2 THEN CIRCLE(121,16),1
8,8,.7:DB$=E2$
550 IF G=3 THEN CIRCLE(197,16),1
8,8,.7:DB$=E3$
560 IF G=4 THEN CIRCLE(47,36),18
,8,.7:DB$=E4$
570 IF G=5 THEN CIRCLE(119,36),1
8,8,.7:DB$=E5$
580 IF G=6 THEN CIRCLE(197,36),1
8,8,.7:DB$=E6$
590 IF G=7 THEN CIRCLE(47,56),18
,.8,.7:DB$=E7$
600 IF G=8 THEN CIRCLE(120,56),1
8,8,.7:DB$=E8$
610 IF G=9 THEN CIRCLE(197,56),1
8,8,.7:DB$=E9$
620 IF G=10 THEN CIRCLE(48,76),1
8,8,.7:DB$=E1$+E0$
630 IF G=11 THEN CIRCLE(122,76),
18,8,.7:DB$=E1$+E1$
640 IF G=12 THEN CIRCLE(198,76),
18,8,.7:DB$=E1$+E2$
650 PLAY"O3L8CEG"
660 DRAW"S24C7BM120,120"+DB$:S=8
670 RETURN
```

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By Bernie Litton

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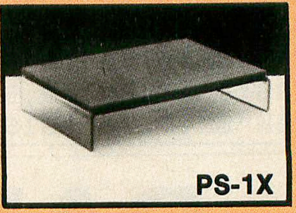

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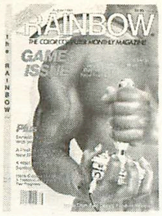

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A monthly issue contains up to 300 pages and as many as two dozen programs, 15 regular columns and more than two dozen product reviews. And advertisements: **THE RAINBOW** is known as *the* medium for advertisers — which means every month it has a wealth of information unavailable anywhere else about new products! Thousands of programs are advertised in its pages every month.

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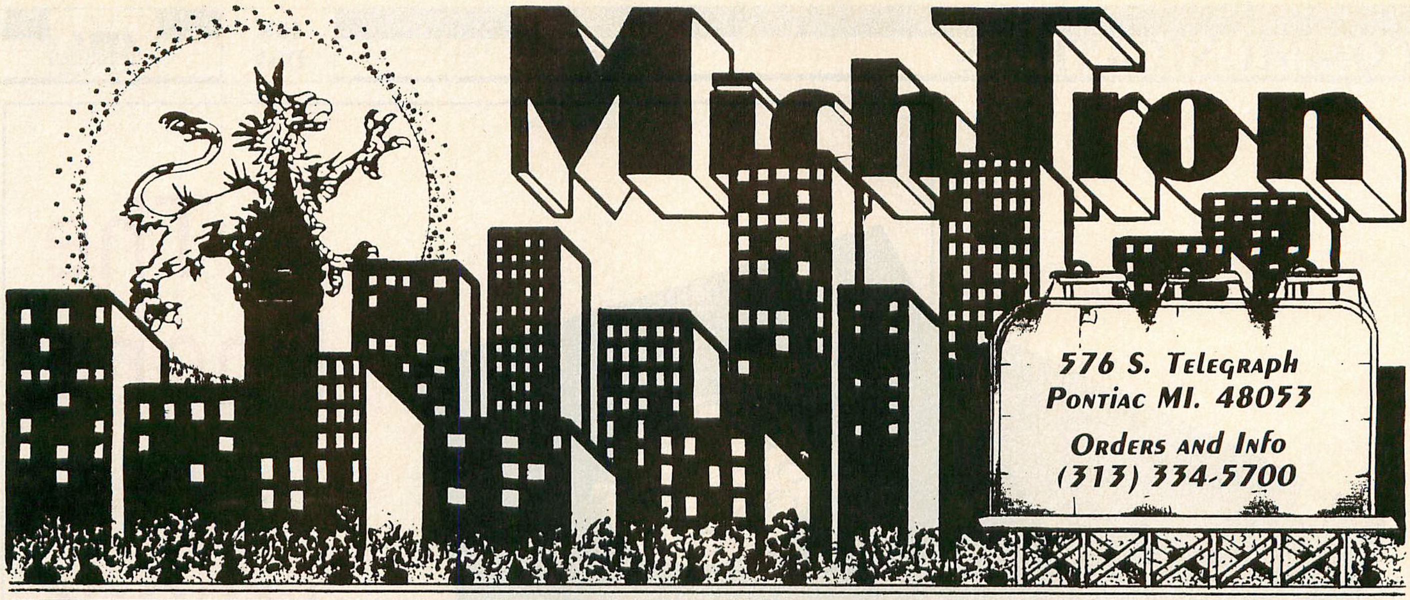

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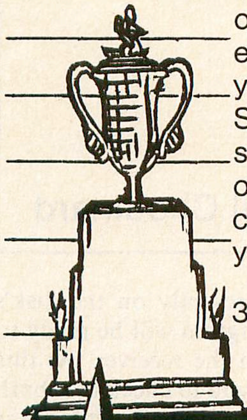
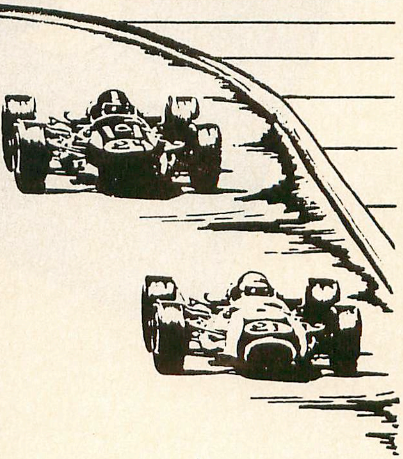
SPEED RACER

by Steven Hirsch



The checkered flag drops as your pulse rises in this lively new arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for the most exciting race the CoCo has ever seen! Vie for time as you speed through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but step lively since some will stop at nothing to see the end of the race, or the end of you! Four challenging raceways, complete with obstacles and colorful 3-D scenery, put your skills to the test in this Pole Position™ type game.



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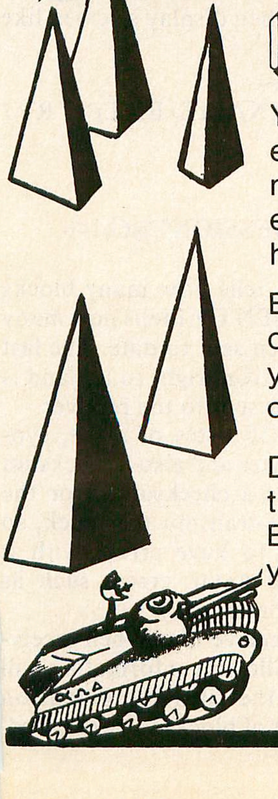
ROMMEL 3-D

By Kary McFadden



You clutch the tank controls, searching for any sign of the enemy. Suddenly a blip appears on radar! Frantically, you move your tank into position. At last you spot the elusive enemy tank! Facing it, you race to lock sights and fire before he does!

Enter the ultimate battle-zone in this exciting 3-D tank combat game. Strategy, speed, and your tank's cannon are your only hope as you wind through a three-dimensional course inhabited by impenetrable barriers and enemy tanks.

Dazzling graphics and lifelike sound take you a step beyond the ordinary in this fast, machine-language arcade game. Enter the next dimension, ROMMEL's troops are waiting for you!

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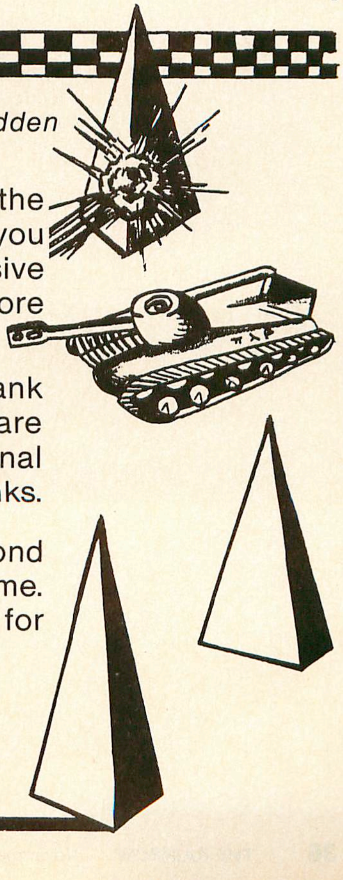
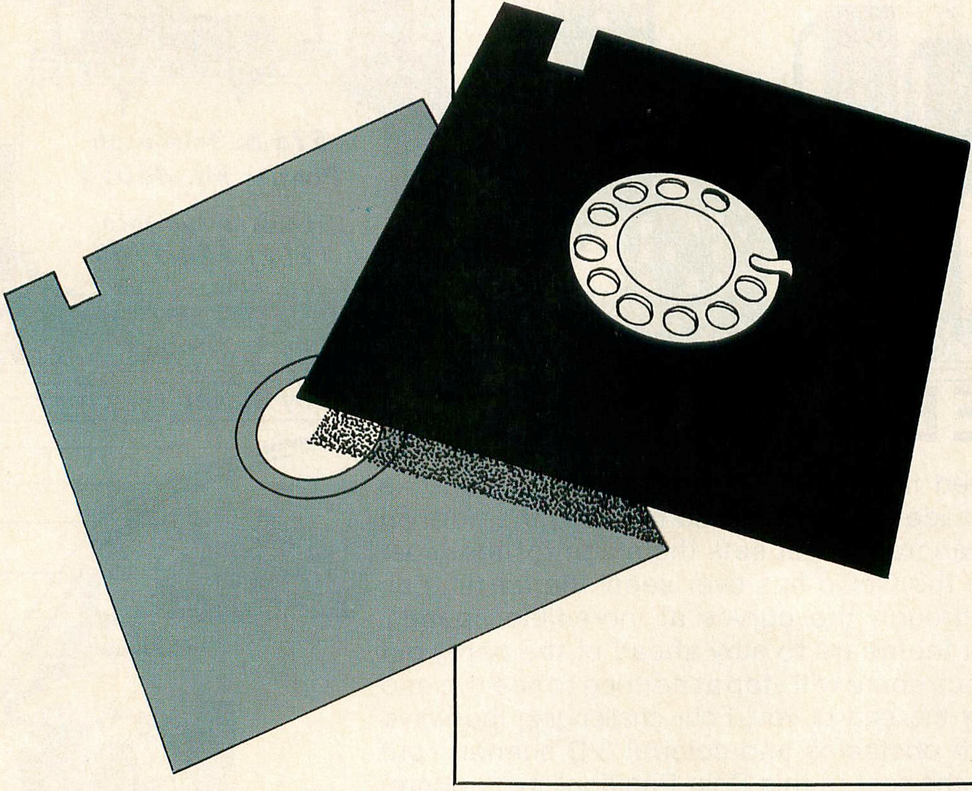




The Phone File Trader

By Daniel Chouinard

A communications program used for trading files over telephone lines, *XFER16* requires a 16K Color Computer, a modem and a disk drive. It works on any system with Radio Shack's Disk Extended Color BASIC or the J&M JDOS V1.7 or later.

It will allow the user to transfer any normal disk file, of any length and type. It is very fast and user friendly, and the main part is written in BASIC.

Type the program Listing 1, save it (make copies!) and then type in Listing 2, save it and run it. Listing 2 generates a machine language file used by the first one. Name the first *XFER16/BAS*. To use the program, simply `RUN "XFER16"`.

What exactly does it do? This is the menu:

1) Send file
2) Receive file
3) Directory
4) Auto transfer
5) Baud rate
6) Return to normal BASIC

Option 1, Send file: Choosing this option, the computer will simply ask you FILENAME (NAME/EXT). Giving a filename presently on the disk's directory, the program will be ready to "send" the file to the receiver. At this point, it will ask you to check that both carriers are established and press ENTER. It will then display a screen like this:

```
---SEND FILE---
FILENAME (NAME/EXT)>TRY/
BAS
BLOCKS:14
 SENT>:1
@,240;"END SESSION":%6h1#b
```

BLOCKS:14 tells how many blocks are to be sent. SENT>:1 tells how many blocks have been sent to date. The last line is scrolling from right to left and is what's presently sent to the receiver.

A block is 255 bytes of a file, synchronization bytes and also a checksum byte; if there is a checksum error the program will re-transmit the block, so it's impossible to have errors with it (except normal BASIC errors such as disk full, I/O Error, etc.).

Option 2, Receive file: When receiving a file, the following information will be displayed: the filename/extension and the number of blocks to be received

Option 3, Directory: This will display the directory of the disk in Drive 0. All disk input and output are done on Drive 0.

Option 4, Auto transfer: Choosing this option at the main menu will give you this submenu:

---AUTO TRANSFER---
<1> SEND FILES
<2> RECEIVE FILES
YOUR CHOICE>?

Auto transfer is used when more than one file is sent at once.

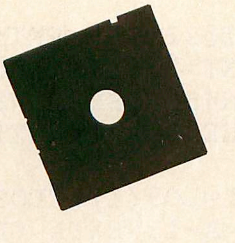
Option 1, Send files (auto): With this option, all you have to do is type in up to 20 filenames and press ENTER to end. The filenames are given in the format "file/ext."

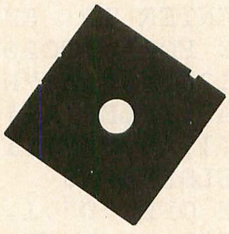
Option 2, Receive files (auto): All chosen files by the sender will be received and saved on disk. Be sure you have enough space for all files (ask the sender how many granules in total).

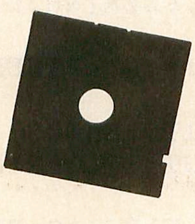
Option 5, Baud rate: The program can send and receive at almost any Baud rate between 10 and 1200. The default value is 300 Baud. However, due to rounding-off errors, some values cannot be used; for instance, 1200 will give 1206. To replace 1200, use 1194 and everything will be OK. From 10 to about 370 Baud, all (integer) values can be used. If you don't get what you want, try a little lower.

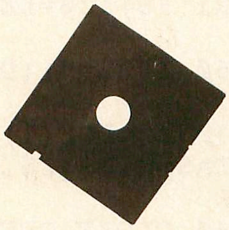
Option 6, Return to BASIC: When this option is chosen at the main menu, you have six seconds to press ENTER. Otherwise, the program will erase itself and return to BASIC. Yes, it's important to use this option; don't just BREAK.

If you have any questions about *XFER16*, send me an SASE at 2215 Sherbrooke E., Apt #2, Montreal, Quebec, Canada H2K 1E2. ☐









110	92	454	54
210	61	610	7
290	244	END	20

Listing 1: XFER16

```
0 ' REM THIS PROG.=XFER16/BAS
1 ' 1984 DANIEL CHOUINARD
2 VERIFYON:PCLEAR1
10 CLEAR2224,&H3E6E:DIMY$(20):IF
PEEK(&H3F00)<>129ORPEEK(&H3F01)<
>84THENLOADM"XFER16
11 POKE&HFF40,0:POKE&H3FFF,0:POK
E&H3FFE,0:BS=&H3FD4:DRIVE0
15 DEFUSR0=&H3E73:DEFUSR1=&H3EDB
:'          SEND          RECEIVE
20 CLS:PRINT"XFER16  1984 DANIEL
 CHOUINARD"
30 PRINT:PRINT"<1> SEND FILE
40 PRINT"<2> RECEIVE FILE
50 PRINT"<3> DIRECTORY
60 PRINT"<4> AUTO TRANSFER
70 PRINT"<5> BAUD RATE
80 PRINT"<6> RETURN TO NORMAL BA
SIC
81 PRINT:PRINT"YOUR CHOICE>?"
90 I$=INKEY$:IFI$>"6"ORI$<"1"THE
N90ELSEON VAL(I$) GOTO100,200,30
0,400,500,600
100 CLS:PRINT" ---SEND FILE---":
PRINT:LINEINPUT"FILENAME (NAME/E
XT) >";F$:IFF$=""THENRUNELSE:IFI
NSTR(1,F$,"/")=0THEN100
110 OPEN"D",1,F$,1:LO=LOF(1):IFL
O=0THENPRINT"NOT FOUND!!!":CLOSE
:KILLF$:GOTO100 ELSECLOSE:OPEN"R
",1,F$,255:LO=LOF(1)
115 GOSUB1000
120 O=PEEK(&HC006)+PEEK(&HC007):
TF=PEEK(O+2):SF=PEEK(O+3):P=INST
R(1,F$,"/"):F1$=STRING$(11,32):M
ID$(F1$,1,8)=LEFT$(F$,P-1):MID$(
F1$,9,3)=RIGHT$(F$,3)
130 DSKI$0,TF,SF,A$,B$:C$=A$+LEF
T$(B$,127):P=INSTR(1,C$,F1$):D$=
MID$(C$,P+11,2)
140 D$=F1$+D$:Z$=USR0(D$):FIELD#
1,255 AS A$:Z$=USR0(STR$(LO))
145 IFLO=0THEN175
 150 FORR=1TOLO:PRINT@128,"BLOCKS
 :";LO
 160 GET#1,R:Z$=USR0(A$):PRINT"SE
 NT:";R
 170 NEXTR
 175 CLOSE:OPEN"D",1,F$,1:LO=LOF(
 1):L=LO-INT(LO/255)*255:IFL=0THE
 N195
 180 B$="":PRINT"SENDING LAST";L"
 BYTES...":L=L-1:FIELD#1,1ASA$:FO
 RR=LO-L TOLO:GET#1,R:B$=B$+A$:NE
 XTR:CLOSE:Z$=USR0(B$)
 190 GOTO3000
 195 Z$=USR0(")(DC16EOF:*;@,<"):G
 OTO190
 200 CLS:PRINT" ---RECEIVE FILE--
 -":PRINT:GOSUB1000:F$=STRING$(13
 ,32):Z$=USR1(F$):RE$=RIGHT$(F$,2
 ):RF$=F$:F$=LEFT$(F$,8)+"/"+MID$
```

```
(F$,9,3):F1$=F$:PRINT:PRINT"RECE
IVING:";F$
210 PRINT@128,"BLOCKS:";:Z$=USR1
(F$):Z$=LEFT$(F$,PEEK(&H3E70)):L
O=VAL(Z$):PRINTLO
215 OPEN"O",1,F1$:CLOSE:KILLF1$
220 OPEN"D",1,F1$,255:A$=STRING$
(255,255):FIELD#1,255ASB$
230 IFLO=0THEN250
240 FORR=1TOLO:PRINT@128+32,"BLO
CK<:";R:Z$=USR1(A$):LSETB$=A$:PU
T#1,R:NEXTR
250 F$=STRING$(255,255):CLOSE:OP
EN"D",1,F1$,1:FIELD#1,1ASA$:Z$=U
SR1(F$):Z$=LEFT$(F$,PEEK(&H3E70)
)
260 IFZ$=")(DC16EOF:*;@,<"THEN28
0
270 LO=LOF(1):FORR=1TOLEN(Z$):LS
ETA$=MID$(Z$,R,1):PUT#1,LO+R:NEX
TR
280 CLOSE:OPEN"D",1,F1$,1:O=PEEK
(&HC006)*256+PEEK(&HC007):TF=PEE
K(O+2):SF=PEEK(O+3):CLOSE
290 DSKI$0,TF,SF,A$,B$:C$=A$+LEF
T$(B$,127):P=INSTR(1,C$,LEFT$(RF
$,11)):MID$(C$,P,P+12)=RF$:A$=LE
FT$(C$,128):B$=RIGHT$(C$,127):DS
KO$0,TF,SF,A$,B$
295 GOTO3000
300 CLS:PRINT" ---DIRECTORY---":
DIR:PRINT"FREE GRANS.>";FREE(0):
LINEINPUT"PRESS ENTER>>>";A$:RUN
400 CLS:PRINT" ---AUTO TRANSFER-
--":PRINT:PRINT"<1> SEND FILES":
PRINT"<2> RECEIVE FILES":PRINT:P
RINT"YOUR CHOICE>?"
410 A$=INKEY$:IFA$=CHR$(13)THENR
UNELSEIFA$<>"1"ANDA$<>"2"THEN410
ELSEONVAL(A$)GOTO420,460
420 CLS:PRINT" ---AUTO SEND---":
PRINT:PRINT"ENTER FILENAMES,PRES
S ENTER TO  END."
430 FORA=1TO20:PRINT@128,"":PRIN
T@128,"#";A;"NAME/EXT>";:LINEINP
UTA$:IFLEN(A$)=0THEN450ELSEP=INS
TR(1,A$,"/"):IFP=0THENA=A-1:NEXT
A ELSEF$=A$
440 OPEN"D",1,A$,1:L=LOF(1):CLOS
E:IFL=0THENKILLA$:A=A-1:NEXTA EL
SEY$(A)=F$:NEXTA
450 POKE&H3FFE,1:POKE&H3FFF,A:IF
A=1THENRUNELSEGOSUB1005:Z$=USR0(
STR$(A-1))
452 CLS:PRINT" ---AUTO SEND---
 FILE#";:A=PEEK(&H3FFF):A=A-1:PO
KE&H3FFF,A:IFA=0THENGOTO3000 ELS
EPRINTA:PRINT:F$=Y$(A):PRINT"FIL
E:";F$
454 GOTO110
460 CLS:PRINT" ---AUTO RECEIVE--
-":GOSUB1005:A$="    ":Z$=USR1(A
$):POKE&H3FFE,2:POKE&H3FFF,VAL(A
$):IFVAL(A$)=0THENRUN
470 GOTO490
480 A=PEEK(&H3FFF):A=A-1:POKE&H3
FFF,A:IFA=0THENGOTO3000
490 GOTO200
500 CLS:PRINT" ---BAUD RATE---":
PRINT:PRINT"PRESENTLY:";
510 BA=PEEK(BS)*256+PEEK(BS+1):B
A=894886/BA/7:PRINTINT(BA)
520 PRINT@128:PRINT@128,"";:LINE
INPUT"NEW BAUD RATE,(ENTER=MENU)
>";A$:IFA$=""THENRUN
530 BA=VAL(A$):IFBA<10ORBA>1200T
HEN520
540 BA=894886/BA/7:BZ=BA/2:C=INT
(BA/256):BA=BA-C*256:POKEBS,C:PO
KEBS+1,BA:C=INT(BZ/256):BZ=BZ-C*
256:POKEBS+11,C:POKEBS+12,BZ:GOT
O500
600 CLS:PRINT" ---END---":PRINT:
PRINT"YOU HAVE 6 SECONDS TO":PRI
NT"PRESS enter,OTHERWISE,BYE BYE
!"
610 FORA=1TO700:IFINKEY$=CHR$(13
```

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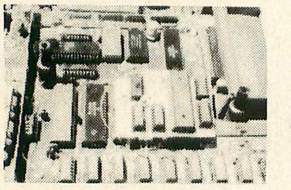

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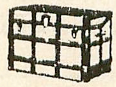

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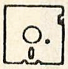

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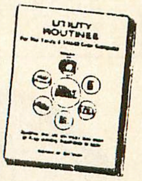

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```
)THENRUNELSENEXT:POKE&H3F00,&H3E
:POKE&HFFDE,0:POKE113,0
620 PRINT:PRINT"AUTO-DESTRUCT...
":FORA=1TO20:NEXTA:EXEC&H3F00
999 STOP
1000 IFPEEK(&H3FFE)=2 ANDPEEK(&H
3FFF)THEN1050ELSEIFPEEK(&H3FFF)T
HENRETURN
1005 QL=PEEK(&H88):QP=PEEK(&H89)
1010 PRINT@32*15,"BOTH CARRIERS
CHECKED,enter";
1020 E=1^1^1:PRINT@32*15,STRING$
(30,32);
1030 IFINKEY$<>CHR$(13)THEN1010E
LSEPOKE&H88,QL:POKE&H89,QP:RETUR
N
1040 CLS:PRINT" ---AUTO RECEIVE-
-- FILE#";PEEK(&H3FFF):RETURN
1050 CLS:PRINT" ---AUTO RECEIVE-
-- FILE#";PEEK(&H3FFF):RETURN
3000 IFPEEK(&H3FFF)THEN3030ELSEC
LS:PRINT"TRANSMISSION DONE!!!"
3010 IFC=0THENC=1:SOUND50,1:SCRE
EN0,1ELSESOUND100,1:SCREEN0,0:C=
0
3020 IFINKEY$=""THEN3010 ELSERUN
3030 IFPEEK(&H3FFE)=1THEN452ELSE
480
```

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Listing 2: ML GEN

```
5 PCLEAR1
10 DATA A0,27,0,0,0,34,1,1A,50,7
F,FF,40,AE,2,BF,3E,6E,F7,3E,70,B
6,3E,70,B7,3E,71,86,55,BD,3F,5F,
BD,3F,84,81,55,26,EE,B6,3E,70,BD
,3F,5F,BD,3F,84,B1,3E,70,26,E0,8
6,54,BD,3F,5F,86,FE,BD,3F,5F,86,
21,BD,3F
20 DATA 5F,7D,3E,70,27,D,BE,3E,6
E,A6,80,BD,3F,5F,7A,3E,71,26,F6,
BD,3F,4C,B7,3E,72,BD,3F,84,B1,3E
,72,26,B1,C6,5,BD,3F,84,5A,26,FA
,35,81,34,1,1A,50,7F,FF,40,AE,2,
BF,3E,6E,BD,3F,84,81,55,26,F9,BD
,3F,5F,BD
30 DATA 3F,84,B7,3E,70,B7,3E,71,
BD,3F,5F,BD,3F,84,81,54,26,E3,BD
,3F,84,81,FE,26,DC,BD,3F,84,81,2
1,26,D5,7D,3E,70,27,D,BE,3E,6E,B
D,3F,84,A7,80,7A,3E,71,26,F6,BD,
3F,4C,BD,3F,5F,C6,3,BD,3F,84,81,
55,27,B4
40 DATA 81,0,26,F5,5A,26,F2,35,8
1,45,43,51,4D,A4,52,27,4B,51,59,
60,55,5B,4F,61,54,34,14,4F,F6,3E
,70,5D,27,8,BE,3E,6E,A8,80,5A,26
,FB,35,94,34,14,BD,3F,AF,7F,FF,2
0,BD,3F,D1,8E,0,8,44,59,59,F7,FF
,20,BD,3F
50 DATA D1,30,1F,26,F3,C6,3,F7,F
F,20,BD,3F,D1,35,94,34,14,4F,8E,
10,0,F6,FF,22,30,1F,27,1C,C5,1,2
6,F5,BD,3F,D1,BD,3F,DC,8E,0,8,F6
,FF,22,54,46,BD,3F,D1,30,1F,26,F
4,BD,3F,AF,35,94,34,14,F6,4,0,C1
,CF,26,4
60 DATA C6,20,20,2,C6,CF,F7,4,0,
8E,5,E0,E6,1,E7,80,8C,5,FF,26,F7
,A7,84,35,94,34,10,8E,1,AA,30,1F
,26,FC,35,90,34,10,8E,0,D5,30,1F
,26,FC,35,90
70 FORC=&H3E6E TO&H3FE6
80 READB$:B=VAL("&H"+B$):POKEC,B
90 A=A+B:NEXTC
100 IFA<>41575THENPRINT"CHECK YO
UR DATA LINES!!!":END
110 VERIFYON:SAVEM"XFER16/BIN",&
H3E6E,&H3FE6,&H3FAA
120 PRINT"YOU CAN NOW RUN XFER16
."
```

Why do more CoCo owners choose 'REAL TALKER'?

Sure it's priced right, but there's more...

Thousands of 'Real Talker' owners know 'Real Talker' beats ALL other Coco voice synthesizers in ease of use and flexibility. And, NO other Coco talker has a clearer, more intelligible voice. That's quite a lot of advantage when you consider Real Talker's unbeatable price. Yet, Real Talker has some important features that you simply will not find in other Coco talkers:

'Real Talker' is compatible with any 16K, 32K, 64K Extended or non-extended Color Computer. It works with any cassette or disk system and comes complete and ready to talk through your T.V. or monitor speaker. Price includes the 'Real Talker' electronic voice synthesizer in a ROM pack, software on cassette (may be transferred to disk), and user manual.

'SAY' command - You'll have your computer talking brilliantly in just minutes thanks to this powerful new command. Type SAY "ANYTHING YOU WANT" and your words are instantly spoken. It's that simple. Think how easy this makes creating speaking Basic programs. Adding speech to your existing programs is a snap too.

'CONVERT' - This is a truly powerful command for the basic programer. CONVERT automatically transforms a machine language dependent speaking program into a stand-alone Basic program. In other words, you can effortlessly write speaking Basic programs that do not require a machine language translator in memory. This is a unique feature of 'Real Talker'. No other voice synthesizer gives you anything even remotely approaching this type of capability - even synthesizers costing considerably more.

'REAL TALKER'
INSTRUCTION
'REAL TALK
HARDWARE VOI
SYNTHESIZER
COLORWARE

'Real Talker' is a full-featured electronic voice synthesizer unit built into a compact cartridge case. You simply plug it into the side of your computer.

NOW INCLUDED WITH 'REAL TALKER'........

1. ***'DR. TALK***-This interactive "Eliza" type psychoanalyst program will discuss your innermost problems at length.

2. ***'TALKING BATTLESHIP'***-It's you vs. the computer in this speaking version of the classic game.

3. ***'TALKING BLACKJACK'***- Play for big stakes against a rather talkative casino dealer.

ONLY

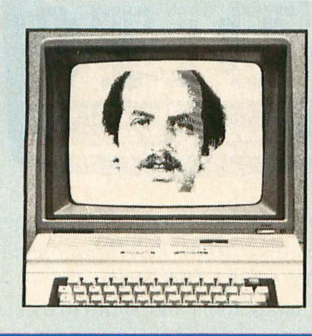
$\$59^{95}$

Other features include software controlled pitch, unlimited vocabulary text-to-speech, and even a program that will recite any ASCII file (such as from Telewriter-64 & other word processors). You also get Colorware's unique full-screen phoneme editor program that let's you experiment with and modify speech at it's most fundimental level.

'REAL TALKER-1' (for the original Color Computer)	***$59.95***
'REAL TALKER-2' (for the Color Computer-2)	***$64.95***
'Y - BRANCHING CABLE' For disk systems. If you have a disk system but do not have a Radio Shack Multi-Slot unit, this economical cable will allow to connect and use your Real Talker and Disk system together	***27.95***

TALKHEAD

If you have a 'Real Talker', do not deprive yourself of this absolutely incredible machine-language Talking Head simulation program. While other talking head simulations use a minimal cartoon-like face, TALKHEAD uses high resolution, full-screen, digitized images of an actual person's face to create a life-like animated effect.



ACTUAL UNRETOUCHED PHOTO

SOFTWARE FOR THE 'REAL TALKER'

TALKHEAD can be easily commanded in Basic to appear on screen and say anything you want. Available on cassette or disk for only $19.95, TALKHEAD requires 64K and a Colorware 'Real Talker'.

ONLY $19.95

COLORWARE

COLORWARE INC.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA

MasterCard

★ ★ ★ ORDERING INFORMATION ★ ★ ★

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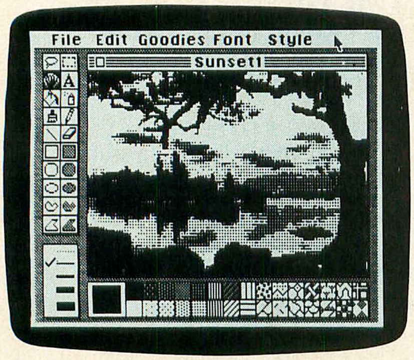
N.Y. RESIDENTS MUST ADD SALES TAX.

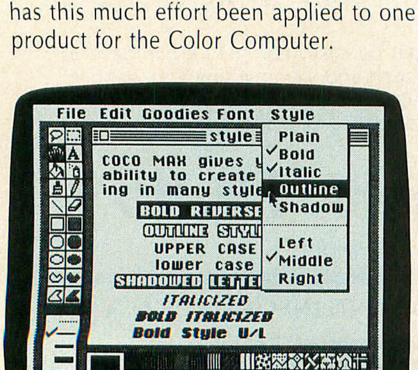
CoCo Max

This is one of those rare programs that will captivate everyone in your family.... No one can see CoCo Max and not want to try it!

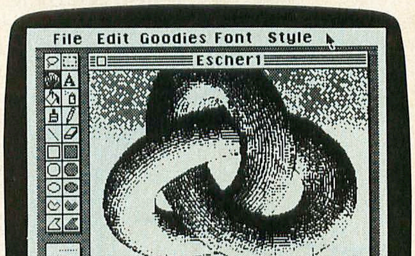

File Edit Goodies Font Style
Sunset1

We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

It was inevitable that this exciting approach would be brought to the CoCo. With this in mind, Colorware chose to go all out and maximize this new concept for the color computer. That meant designing not just software but hardware too. It meant thousands of hours of pure machine language programming. Rarely has this much effort been applied to one product for the Color Computer.


File Edit Goodies Font Style
style
Plain
✓Bold
✓Italic
Outline
Shadow
Left
✓Middle
Right

COCO MAX gives y
ability to create
ing in many styl
BOLD REVERSE
OUTLINE STYL
UPPER CASE
lower case
SHADOWED LETTE
ITALICIZED
BOLD ITALICIZED
Bold Style U/L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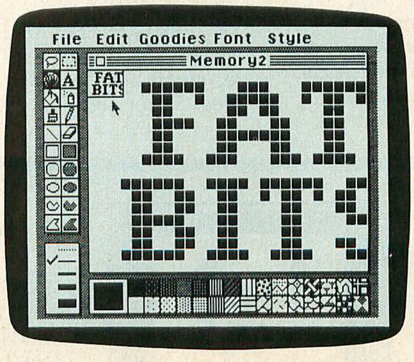
Escher1

UNMATCHED CAPABILITY...

Because we took the maximum approach: highly optimized machine code combined with hardware, CoCo Max truly stands above the rest as the ultimate creative tool for the Color Computer. It's unrivaled performance lets you create with more brilliance and more speed than any similar system – much more than you ever imagined possible. And, you can do it in black & white or color.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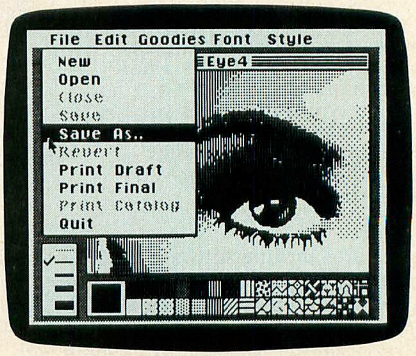
Memory2
FAT BITS
FAT
BITS

All the sophisticated power of the bigger systems is there: ***Icons, Pull-Down Menus,*** full ***Graphic Editing, Font Styles,*** and all kinds of handy tools and shortcuts.

Plug your joystick, mouse or touch pad into CoCo Max's Hi-Res Input Unit. Then use a delightfully simple ***Point-and-Click*** method to get any of CoCo Max's powerful graphic tools. It has them all: You can ***Brush, Spray*** or ***Fill*** with any ***Color, Shading*** or ***Pattern.*** Use ***Rubber Band Lines*** and ***Shapes*** (square, rectangle, circle, elipse, etc.) to create perfect illustrations with speed and ease. There's a ***Pencil,*** an ***Eraser*** and even a selection of ***Caligraphy Brushes.*** And, as you can see, CoCo Max can do a lot with text.
All of the newest special effects are there: ***Trace Edges, Flip, Invert, Brush Mirrors,*** etc. And all of the very latest super-capabilities like: ***Undo,*** which automatically reverses your mistakes, and ***Fat Bits*** which zooms you way in on any part of your subject to allow dot-for-dot precision.


File Edit Goodies Font Style
Eye4
New
Open
Close
Save
Save As..
Revert
Print Draft
Print Final
Print Catalog
Quit

THE BIG PICTURE

The large image box in the middle of the CoCo Max screen is actually only a window on an even larger image. Use the Point-and Click "Hand" to effortlessly move your window over any portion of the larger image. You have a working area of up to 3-½ times the area of the window itself.

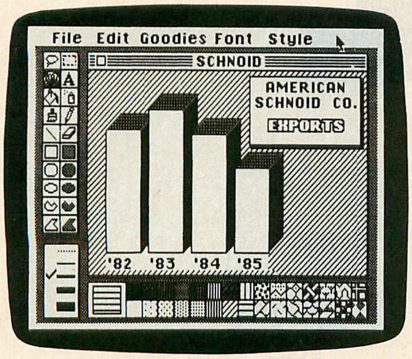
FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than ¼ page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to ⅛ page size.

THE COCO MAX SYSTEM

FREEDOM TO CREATE...

Anyone who wants to create anything at all on their CoCo screen or printer will certainly be very glad to meet CoCo Max. CoCo Max's friendly yet sophisticated graphic and text capabilities let you almost instantly produce illustrations, diagrams, charts,



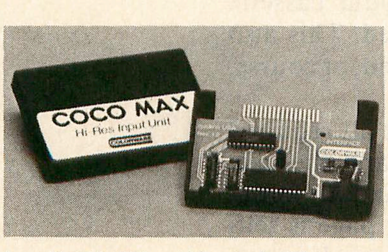
graphs, and computer art – for serious use or just for creative fun.

AN ABSOLUTE GUARANTEE

CoCo Max is a hardware/software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 20 days for a full, courteous refund from Colorware.

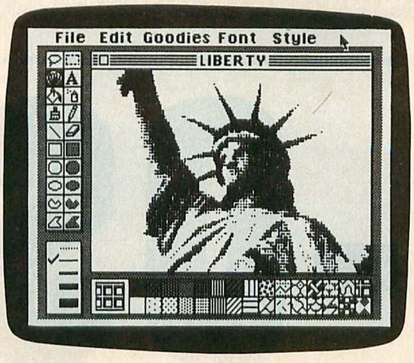
THE HARDWARE...

This is the key to CoCo Max's unmatched performance. Did you know the normal joystick input built into the Color Computer only allows access to 4,096 (64 x 64) points on the CoCo screen? Yet, the Color Computer's high resolution screen



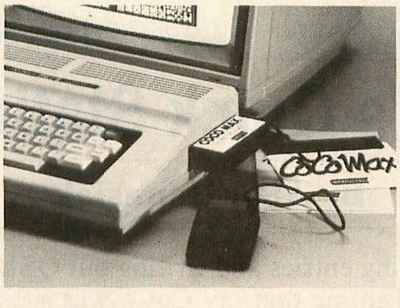
has 49,152 (256 x 192) pixels. This means that a joystick, mouse or even a touch pad can, at best, only access about one tenth of the pixels on the CoCo screen.

Most graphic programs ignore this hardware limitation of the Color Computer and give you only low-res control. Others attempt to overcome the limita-



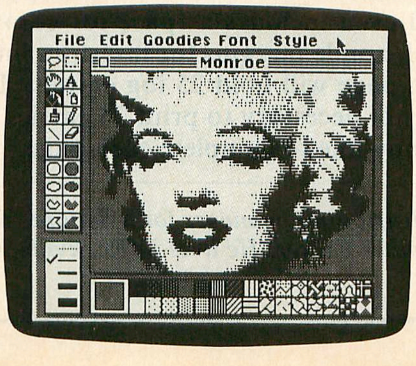
tion by using software schemes such as sliding windows. Although clever, these schemes yield sluggish and awkward results. Only CoCo Max does it the right way. The CoCo Max Hi-Res Input Unit plugs into your ROM slot and adds an entirely new joystick input to your computer – a precision one with a 49,152 point resolution to match the CoCo screen exactly.

Plug your same joystick, mouse or touch pad into this new input and you have a whole new kind of control. The difference is remarkable.

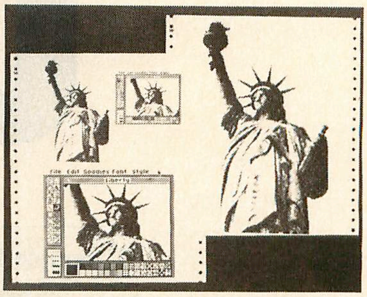


A DIGITIZER OPTION...

We studied all the video digitizers available and picked the best of them to link with CoCo Max. The DS-69 from Micro Works was our choice. This optional device lets you capture the image from any video source (video recorder, camera, etc.) on your Color Computer.



You may then use CoCo Max's graphic magic on it. The DS-69 is available as an option from Colorware from $149.95 complete with its own software on disk or tape. Using the DS-69 with a disk requires an RS multi-pak adaptor.



COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

THE COMPLETE COCO MAX SYSTEM,
with software on *DISK*........... ***$69.95***

with software on *CASSETTE* (Available Mar '85)......................... ***$69.95***

Y-BRANCHING CABLE-If you have a disk system but do not have a Multi-Slot Interface, use this economical 40-pin, 1 male, 2 female cable to connect the CoCo Max Hi-Res input unit and your disk controller to your CoCo..... ***$27.95***

Sorry, COCO MAX is not compatible with JDOS

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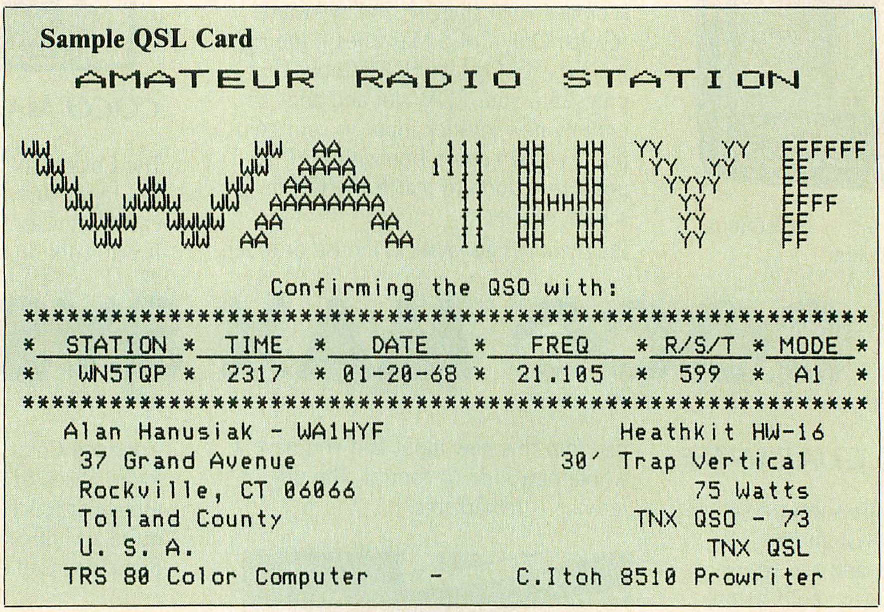
C-QSL



Sample QSL Card

```
AMATEUR RADIO STATION

Confirming the QSO with:
**********************************************************
*  STATION * TIME  *   DATE    *   FREQ    * R/S/T * MODE *
*  WN5TQP  * 2317  * 01-20-68  *  21.105   *  599  *  A1  *
**********************************************************
 Alan Hanusiak - WA1HYF                  Heathkit HW-16
  37 Grand Avenue                     30' Trap Vertical
  Rockville, CT 06066                          75 Watts
  Tolland County                           TNX QSO - 73
  U. S. A.                                      TNX QSL
 TRS 80 Color Computer    -         C.Itoh 8510 Prowriter
```

CoCo's Quick Station Log

By Alan Hanusiak

While logging entries and writing out QSL cards, the thought occurred to me that my CoCo was sitting idle while I was doing the work. Somehow this didn't seem right, so I wrote a program to make CoCo do some of the work.

Ham QSL and Log Page takes all necessary information about your contacts and prints out a log page sheet or QSL card. It also allows you to save and retrieve all of this information with your cassette recorder, so the log entries don't even have to be printed. This also meets the FCC requirements for logging contacts, provided, of course, you save the tapes.

The log page format is a standard one and prints out all required information, and even includes a space for comments and the like. It is designed with ample margins for insertion into a standard looseleaf binder. Each page will hold 25 log entries. The log page is self-indexing, so it is not necessary to print 25 entries each time. You can start printing at any line to complete each page.

(Alan Hanusiak, distribution manager for a national food service company, is a weekend computer hacker. He lives in Rockville, Conn.)

Sample Log Sheet

```
*******************************************************************************************************
*|    |          | STATION  |        |   HIS    |   HIS    |    MY    |          | EMIS- | POWER | TIME OF |       |*
*|    |   TIME   | CALLED   | CALLED |  FREQ/   | SIGNALS  | SIGNALS  |    MY    | SION  | INPUT | ENDING  | QSL'S |*
*|    |   DATE   |  NAME    |   BY   |  INFO    |   RST    |   RST    |  FREQ.   | TYPE  | WATTS |   QSO   | S | R |*
*******************************************************************************************************
*|  1 |   0540   | K4JVH    |   X    |  3.739   |   569    |   539    |  3.735   |  A1   |  75   |  0608   |   |   |*
*|    | 12-22-67 |  BOB     |        | MAIDEN, S.C.                                                                 |*
*|  2 |   1822   |    X     | WB2ZEC |  3.735   |   569    |   579    |  3.735   |  A1   |  75   |  1848   |   |   |*
*|    | 12-22-67 |  PHIL    |        | KATONIA, N.Y.                                                                |*
*|  3 |   1852   |    X     | WA2YGB |  7.152   |   599    |   579    |  7.152   |  A1   |  75   |  1920   |   |   |*
*|    | 12-22-67 |  JOHN    |        | DUMONT, N.J.                                                                 |*
*|  4 |   2246   |    X     | WN3HUD |  3.735   |   589    |   589    |  3.735   |  A1   |  75   |  2300   |   |   |*
*|    | 12-22-67 |  SAM     |        | SPRUCE CREEK, PA.                                                            |*
*|  5 |   0325   | WA8TSE   |   X    |  3.735   |   459    |   359    |  3.735   |  A1   |  75   |  0340   |   |   |*
*|    | 12-31-67 |  ROY     |        | CINCINNATI, OHIO                                                             |*
*|  6 |   2115   | WN1IED   |   X    |  3.731   |   579    |   477    |  3.735   |  A1   |  75   |  2148   |   |   |*
*|    | 12-31-67 |  STEVE   |        | PEABODY, MASS.                                                               |*
*|  7 |   2150   |    X     | WN1HKP |  3.735   |   599    |   589    |  3.735   |  A1   |  75   |  2300   |   |   |*
*|    | 12-31-67 |  HAL     |        | HOLDEN, MASS.                                                                |*
*|  8 |   0328   | WN5TCL   |   X    |  3.738   |   469    |   559    |  3.735   |  A1   |  75   |  0338   |   |   |*
*|    | 01-01-68 |  BOB     |        | HARRISON, ARK.                                                               |*
*|  9 |   0719   | WNORTA   |   X    |  3.739   |   479    |   589    |  3.735   |  A1   |  75   |  0751   |   |   |*
*|    | 01-06-68 |  JIM     |        | WINONA, MINNESOTA                                                            |*
*| 10 |   1935   |   CQ     |   X    |          |          |          |  21.103  |  A1   |  75   |         |   |   |*
*|    | 01-06-68 |          |        |                                                                              |*
*| 11 |   1936   |    X     | W0ZLN  |  21.103  |   479    |   569    |  21.103  |  A1   |  75   |  1952   | Y |   |*
*|    | 01-06-68 |  TIM     |        | COLUMBIA, MO.                                                                |*
*| 12 |   2217   |    X     | WN0SKP |  21.106  |   589    |   589    |  21.103  |  A1   |  75   |  2242   | Y | Y |*
*|    | 01-06-68 |  TOM     |        | ST. LOUIS, MO.                                                               |*
*| 13 |   2250   | WN0RRR   |   X    |  21.106  |   589    |   579    |  21.103  |  A1   |  75   |  2257   |   |   |*
*|    | 01-06-68 |  TONY    |        | WESTMINSTER, COLORADO                                                        |*
*| 14 |   0104   | WN4HMX   |   X    |  3.736   |   569    |   559    |  3.735   |  A1   |  75   |  0110   |   |   |*
*|    | 01-13-68 |  SETH    |        | ARLINGTON, VA.                                                               |*
*| 15 |   1859   |    X     | WN4HOI |  21.110  |   579    |   589    |  21.103  |  A1   |  75   |  1931   | Y | Y |*
*|    | 01-13-68 |  CHARLES |        | ATHENS, GA.  PO BOX 2242  UNIVERSITY STATION                                 |*
*| 16 |   2009   |    X     | WNOSXZ |  21.103  |   589    |   589    |  21.103  |  A1   |  75   |  2038   | Y | Y |*
*|    | 01-20-68 |  EARL    |        | AURORA, COLORADO                                                             |*
*| 17 |   2045   | WN0YYO   |   X    |  21.107  |   469    |   479    |  21.103  |  A1   |  75   |  2058   |   |   |*
*|    | 01-20-68 |  DON     |        | SAN MATEO, CALIFORNIA                                                        |*
*| 18 |   2317   |    X     | WN5TQP |  21.105  |   599    |   589    |  21.103  |  A1   |  75   |  2332   | Y | Y |*
*|    | 01-20-68 |  JOE     |        | ALBUQUERQUE, N.M.                                                            |*
*| 19 |   0717   |   CQ     |   X    |          |          |          |  7.152   |  A1   |  75   |         |   |   |*
*|    | 01-27-68 |          |        |                                                                              |*
*| 20 |   0718   |    X     | W6ZQC  |  7.155   |   459    |   479    |  7.152   |  A1   |  75   |  0809   | Y | Y |*
*|    | 01-27-68 |  BOB     |        | LOS ANGELES, CA.                                                             |*
*| 21 |   0809   |    X     | WN6ZFG |  7.155   |   359    |   479    |  7.152   |  A1   |  75   |  0832   | Y | Y |*
*|    | 01-27-68 |  RANDY   |        | LOS ANGELES, CALIFORNIA                                                      |*
*| 22 |   1951   |   CQ     |   X    |          |          |          |  7.152   |  A1   |  75   |         |   |   |*
*|    | 02-22-68 |          |        |                                                                              |*
*| 23 |   1952   |    X     | VE2DAB |  7.152   |   479    |   479    |  7.152   |  A1   |  75   |  1909   |   |   |*
*|    | 02-22-68 |          |        | MONTREAL, CANADA                                                             |*
*| 24 |   1914   |    X     | WN4GMH |  7.152   |   479    |   569    | . 7.152  |  A1   |  75   |  1930   | Y | Y |*
*|    | 02-22-68 |  DICK    |        | FT. WALTON BEACH, FLORIDA - CW MOBILE                                        |*
*| 25 |   2038   |    X     | WN6WHI |  21.104  |   579    |   579    |  21.103  |  A1   |  75   |  2102   |   |   |*
*|    | 03-02-68 |  MILT    |        | SAN BERNADINO, CA.                                                           |*
*******************************************************************************************************
```

The QSL card printout is based on a 3 by 5-inch card, which is a standard postcard size. This area requires customizing to reflect the necessary information for your station. Right side tabs will probably have to be changed to keep the same format as mine. For those without QSL cards, this will be a welcome addition.

The program requires a smart printer with a number of features, including different type fonts. My printer is a C. Itoh 8510 Prowriter and has these features. For other printers, some modification of the program will be necessary. A list of the printer control codes is included at the end of the article for reference purposes.

> ***"While logging entries and writing out QSL cards, it occurred to me that CoCo was idle while I did all the work, so I wrote a program to make CoCo do some of the work."***

The only point to emphasize is that for log pages you must always index the paper to TOF (top of form). The program will take the paper to the proper print line. My TOF index is the top of the paper guide rollers, which is about five lines above the actual print line. You will have to determine your own index point.

As designed, the program is screen oriented with plenty of prompts and necessary information, so very little actual instruction is required to use this program.

Program Line Functions

Lines 1-3 are the usual title screen. It looks pretty, so type it in.

Lines 5-8 allocate string space and dimension the number of data strings we can use. More than 99 entries causes the program to slow down considerably and it is very seldom that you will put that number of entries in at one time. From there, we go on to a straightforward screen main menu. It is quite self-explanatory.

Lines 9-31 are the data input. The input screens are designed so that where possible, the ENTER key is used to repeat unchanging information. Previous entries appear on the screen as "last entry was." Pressing ENTER on these screens repeats the data to the new string. Pressing ENTER on the "Station Called" or "Called By" screens automatically enters an 'X' (indicating your station) to the data string. New data may be typed in on any screen at any time.

Lines 32-35 are the printer menu. Here we have the choice of what to print first, log page or QSL card. It doesn't matter which. Bear in mind that each item can be printed as many times as you wish so long as you do not leave the printer menu. After you select 3 — End Of Printing — you will not be able to print again until reloading data from your cassette. Again, the menu is self-explanatory.

Lines 36-38 tell us how many entries are presently in memory. It also prompts you to set the paper to TOF. This portion of the program also directs us to the proper printout section for QSL cards or log pages.

Lines 39-43 set up the proper print line for the log page. It is important to remember that the paper should always start at the TOF index, regardless of the entry number to be printed on the log page. If entry #1 should be chosen, the log page header is printed first, followed by the log entries presently in memory. All entries print in the order they are entered.

Lines 44-62 take the string of data and break it down to usable component parts for printing. This is used for both the log sheet and the QSL cards.

Lines 63-77 are the log entry printout segment. As well as printing each log entry, this portion also counts entry numbers on the log page and stops at the 25th entry, sending you back to the instructions on the printer paper.

Printer Control Codes for the C.Itoh 8510 Prowriter

CHR$(27)"E"	=	Elite print (12 cpi)
CHR$(27)"N"	=	Pica print (10 cpi)
CHR$(27)"X"	=	Underline on
CHR$(14)	=	Elongated print on
CHR$(27)"]"	=	Bi-directional printing
CHR$(27)"T15"	=	15/144 Linefeed
CHR$(150)	=	|
CHR$(27)"Q"	=	Compressed print (17 cpi)
CHR$(10)	=	Two-space linefeed
CHR$(27)"Y"	=	Underline off
CHR$(15)	=	Elongated print off
CHR$(27)"["	=	Uni-directional printing
CHR$(27)"A"	=	Normal linefeed (1/6 inch)

Lines 78-81 offer a screen preview of the next QSL card to be printed and the option of printing it or not. If you choose to print that particular card, it will. Otherwise, you go back to the string sorter and pull out the next entry to decide upon.

Lines 82-106 are the actual QSL card printouts. This is the portion that must be changed to print the proper call sign and station information.

Lines 107-112 set up the cassette recorder to save all the information that has been entered. As it works out, it is sometimes much more convenient to just save the data for several days, then print out the log pages and QSL cards when there is some time available. You are also asked for a file date, which I put in so it is not necessary to even print the log, so long as the records are available if necessary.

Lines 113-120 retrieve the information that was previously saved to the cassette by file date.

Lines 121-138 print the log page header, then automatically go to the log entry printout section.

Ham QSL and Log Page has proven useful as the contacts can be logged as you make them and saved to tape immediately. It prints a nice, legible log page and saves the cost of bound log books.

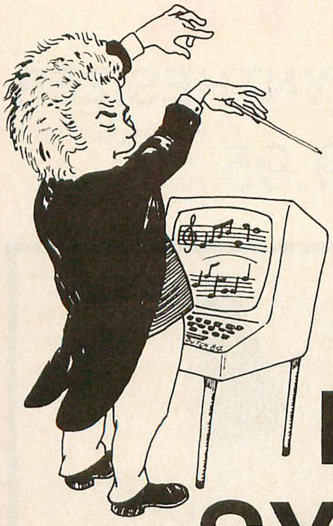
As with all programs, I know some people will tinker with the listing. Being a novice programmer, I am very interested in seeing these changes and would appreciate a copy of any modifications. I will be happy to lend a hand if the program does not run correctly. Write me at 37 Grand Avenue, Rockville, CT 06066 or call between 7 and 10 p.m., EST, at (203) 875-2027.

Line Changes to Reflect Your Call Sign or Information

Lines 85-90 should be changed to your call sign. Bear in mind the 3 by 5-inch parameters of the QSL post card do not exceed the width of my call sign. However, this certainly should give enough leeway to be creative. Note the linefeed and print direction have been changed here to print the lines with no space between and to vertically align the letters. I would also like to see what you come up with for a card, so please send me a copy.

Lines 100-105 should be changed to reflect your name, address and other station and equipment information. ☐

FROM THE PEOPLE THAT BROUGHT YOU



COMPOSER

STEREO COMPOSER

MUSICA

STEREO PAK

MUSIC LIBRARY

SYNTHER 77 PLUS

MUSIC THEORY

SUPER SYNTH

PIANO KEYBOARD

COCO MIDI

MUSICA 2

COMES . . .

SYMPHONY 12™

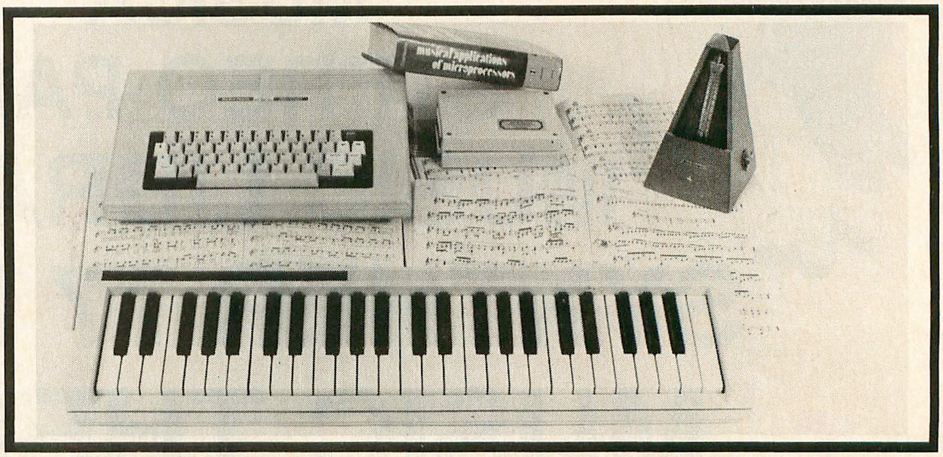
A 12 VOICE POLYPHONIC STEREO MUSIC SYNTHESIZER

$79.95

$69.95 WHEN PURCHASED WITH MUSICA 2

$59.95 WHEN PURCHASED WITH THE PIANO KEYBOARD

- 12 SIMULTANEOUS VOICES
- STEREO & MONO
- 4 NOISE GENERATORS
- SOUND EFFECTS
- PLAYS AND CREATES MUSICA 2 FILES



SUPER POLYPHONIC. Speech Systems is proud to bring you SYMPHONY 12, a polyphonic 12 voice hardware stereo music synthesizer for the Color Computer. SYMPHONY 12 also gives you 4 noise generators for percussion synthesis and sound effects. The PIANO KEYBOARD and MUSICA 2 (sold separately) turns your COCO into a real music machine with incredible flexibility.

STEREO and MONO. By connecting SYMPHONY 12 to your home stereo system, music is produced in stereo, 6 voices from each channel. However, you don't need to have a stereo system, all 12 voices also come out of your TV or monitor.

PICK AN INSTRUMENT. SYMPHONY 12 lets you choose from 10 preset instruments to synthesize chimes, violin, oboe, banjo, harpsichord, piano and more. You can even change instruments as the music plays.

SOUND EFFECTS. SYMPHONY 12 is a sophisticated sound generator. 12 voices and 4 noise generators give you incredible sound effect capability. We have included gun shot, explosion, racing car and more.

WATCH IT PLAY. As SYMPHONY 12 plays, a graphics display of a piano keyboard shows the notes playing. The display is entertaining as well as very educational.

PLAY MUSICA 2 FILES. Thousands of MUSICA 2 users will be excited to know SYMPHONY 12 plays all music developed using MUSICA 2 like you have never Seen or Heard it. In fact we highly recommend the use of MUSICA 2 as a composition development tool for SYMPHONY 12. Use MUSICA 2's superior graphics input capability and then play it through SYMPHONY 12. You can also take advantage of our MUSIC LIBRARY series (sold separately) to give you access to over 500 music pieces representing 20 hours of music.

ULTIMATE MUSIC DEVELOPMENT SYSTEM. SYMPHONY 12, MUSICA 2, and the PIANO KEYBOARD give you incredible flexibility. Imagine sitting down at the PIANO KEYBOARD, playing a piece and recording it as you play just as you would to a tape recorder. Save your masterpiece and then using MUSICA 2 edit it if you like and print it. If you have a MIDI synthesizer, you can take the music and play it using COCO MIDI (sold separately). Try that on an IBM, APPLE, or COMMODORE (good luck).

PIANO KEYBOARD. For those wishing to turn SYMPHONY 12 into a real polyphonic synthesizer we offer the extremely powerful and versatile PIANO KEYBOARD. The PIANO KEYBOARD was deisgned to be used in our entire music product line. You can use it with SYMPHONEY 12, MUSICA 2, SYNTHER 77 PLUS, and even our advanced speech synthesizer, SUPER VOICE.

When using MUSICA 2, you will be using 4 of the 12 voices available from SYMPHONY 12. To take advantage of the full 12 voice capability of SYMPHONY 12 you may use either the Color Computer's keyboard or the PIANO KEYBOARD.

Y-CABLE or MULTI-PAK. Tape users using both SYMPHONY 12 and the PIANO KEYBOARD will require a Y-CABLE. Disk users will require the Triple Y-Cable or MULTI-PAK.

SYMPHONY 12. You get over a dozen music and sound effect selections and complete documentation. Software is shipped on Tape or Disk.

OPTIONS

MUSIC LIBRARY (each volume)	$29.95
MUSICA 2	$29.95
PIANO KEYBOARD 2½ octave	$79.95
PIANO KEYBOARD 4 octave	$119.95

FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA MasterCard

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We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD charge	$2.00

Illinois residents add 6¼% sales tax

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1 MEGABYTE COLORAMA **(312) 879-6811 (24 HR. BBS)**

CALL ANY DAY TO ORDER. ALSO ORDER BY MAIL OR BBS.

AWESOME

STEREO PAK™ $39.95

Plug this gem into your computer, connect to your home stereo system and sit back and enjoy music realism. The STEREO PAK is a hardware music synthesizer that plays our MUSIC LIBRARY series and MUSICA 2 music in stereo. Because it was designed specifically with music reproduction in mind, the sound is superb. The highs are crisp and clear while the bass notes will rattle your walls. Internally we use two high performance 8 bit digital to analog converters to assure fidelity.

The STEREO PAK is all hardware. It is intended as an enhancement for MUSICA 2 and our MUSIC LIBRARY series. Disk users will require our Y-CABLE or a MULTI-PAK.

NEW

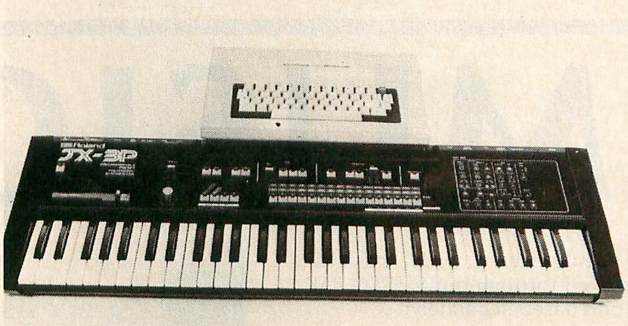
COCO MIDI™ $39.95

Tape or Disk

Now your COCO can talk to your MIDI music synthesizer. Whether you have a Korg, Roland, Casio, or Yamaha, it doesn't matter as long as it's MIDI equipped.

COCO MIDI takes any MUSICA 2 music file and plays it through your music synthesizer. We offer you over 500 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using the best music composition program available, MUSICA 2 (sold separately).

COCO MIDI includes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.



20 HOURS OF MUSIC

MUSIC LIBRARY™ $29.95

Tape or Disk

The MUSIC LIBRARY series consists of 5 volumes: 100, 200, 300, 400, and 500 each sold separately. Each contains over 100 four voice music selections with a playing time of over 3 hours each. The disk version is shipped on 5 full disks. When coupled with the STEREO PAK, the music is reproduced with unsurpassed realism.

A JUKEBOX program is included to allow you to select specific songs or automatically play each. These songs are ready to go, you don't need MUSICA 2 or a knowledge of music. MUSICA 2 users may customize each song. Requires minimum of 32K.

MUSIC LIBRARY 100

Stage, Screen, & TV
Music of the 70's
Music of the 60's
Music of the 50's
Old Time Favorites
Classical
Christmas (popular)
Christmas (traditional)
Patriotic
Polka Party

MUSIC LIBRARY 200 (another 100 selections)
MUSIC LIBRARY 300 (another 100 selections)
MUSIC LIBRARY 400 (another 100 selections)
MUSIC LIBRARY 500 (another 100 selections)

Each volume sold separately, specify tape or disk.

Write for complete list.

SAVE $50!

ALL 500 $99.95

NEW

SYNTHER 77 PLUS $29.95

Tape or Disk

We put the PLUS in SYNTHER 77 PLUS by connecting our PIANO KEYBOARD so you can really play your COCO like a piano.

You control vibrato pattern, Bender rate, Volume level as well as Attack, Decay, Sustain, and Release (ADSR envelope). As you play you can record, then edit and save it to disk or tape. You can even fine tune it to match other instruments.

The PIANO KEYBOARD is not necessary, you can use your COCO keyboard but the PIANO KEYBOARD makes your COCO a real music instrument.

FOR
MUSICA 2
SUPER VOICE
SYMPHONY 12
SYNTHER 77

♫ PIANO KEYBOARD ♫

Now you can really play your Color Computer and pick any or all 4 instruments: **MUSICA 2, SYNTHER 77 PLUS, SUPER VOICE,** and the ultimate **SYMPHONY 12.**

MUSICA 2 users can use the PIANO KEYBOARD as an easy method to input music. Version 2.6 is required. Previous users may obtain an update by returning original tape or disk with $7.00.

SYNTHER 77 PLUS turns your COCO into a music synthesizer without any additional hardware. You specify Vibrato, Bender, Volume, as well as Attack, Decay, Sustain, and Release (ADSR).

SUPER VOICE, COCO's most advanced speech synthesizer becomes a music synthesizer when connected to the PIANO KEYBOARD.

SYMPHONY 12 and the PIANO KEYBOARD gives you a professional 12 voice music synthesizer.

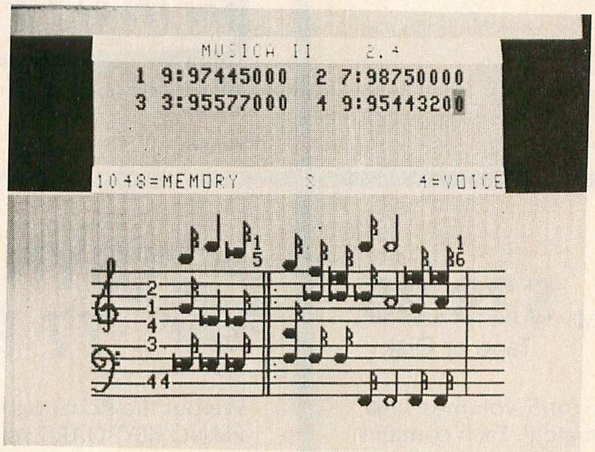
These Piano Keyboards are not toys. They are the same style, shape, size, and feel as professional synthesizer keyboards. Disk owners must use a Y-CABLE or MULTI-PACK.

2½ octave (32 note)	**$79.95**
4 octave (49 note)	**$119.95**

MUSICA 2 $29.95

Tape or Disk

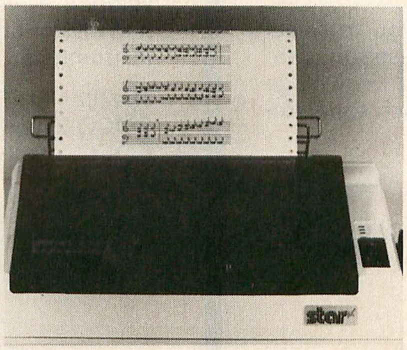
- When in stereo mode, music is played through our STEREO PAK (purchased separately).
- Loudness of each voice may be individually specified.
- Memory available is constantly displayed.
- Voice waveshapes may be exchanged between voices at any point.
- Tempo may be specified and may even be altered as the music plays.
- Flats and sharps supported.
- Billions of timbre combinations.
- High resolution graphic display, looks just like sheet music.
- MUSICA 2 is 100% software, no need for hardware unless you want music produced in STEREO. In that case, the STEREO PAK may be purchased separately. It's a must for the audiophile!
- Repeat bars allow repeating of music without re-inserting music a second or third time.
- 30 page manual describes all.
- Requires minimum of 32K.



```
        MUSICA II     2.4
  1 9:97445000  2 7:98750000
  3 3:95577000  4 9:95443200

1048=MEMORY       3        4=VOICE
```

- Output music to your printer (Gemini 10X, Epson, R.S. printers).



- Allows you to specify key signature.
- Voice timbre (waveshape) may be altered by specifying harmonic content just like stops on an organ.
- During editing, voice being inserted is displayed.
- Each measure is numbered for easy reading of music.
- Measure bars aid in reading and developing music.
- Each voice may be visually highlighted for easy identification.
- 4 Voices produced simultaneously.
- Input notes from Coco keyboard, joystick, or Piano Keyboard.
- Play music from your own BASIC program.
- Block copy music for easy music development.
- 100% machine language so it is lightning fast.
- Vibrato effect easily produced.
- With STEREO PAK, voices may be switched between left and right speakers as music plays.
- Durations include: whole, half, quarter, eighth, sixteenth, thirty-second, sixty-fourth, and triplet.

♫ ♫ MUSIC THEORY ♫ ♫

An advanced music course that covers Major and Harmonic Minor scales, interval spelling, Triad (Chord) theory, Inversions, Dominant 7th chords, and interval ear training. Format of the course includes drill and practice sessions, a scorecard to measure progress, graphics and sound output, and a reviewing session.

32K Disk only **$49.95**

'SUPER VOICE' T.M.

musical applications of microprocessors

COCO'S MOST ADVANCED SPEECH SYNTHESIZER.

IT TALKS, SINGS AND MORE.

only . . . $79.95

WITH EARS OR PIANO KEYBOARD PURCHASE

only . . . $59.95

SUPER VOICE is no ordinary speech synthesizer. It uses Silicon Systems, Inc. SSI-263, the most advanced speech/sound chip available. SUPER VOICE is not only capable of highly intelligible speech, sound effects, and singing over a 6 octave range, but now we have turned SUPER VOICE into a monophonic Super Music Synthesizer with our PIANO KEYBOARD.

IT TALKS. A free TRANSLATOR text-to-speech program makes writing your own talking program as easy as SAYING "HELLO."

SUPER VOICE works in any 32K or 64K computer. A disk system requires a Y-Cable or Multi-Pak.

Here are the facts; the decision is yours.

	SUPER VOICE	REAL TALKER	RS SPEECH CARTRIDGE	VOICE-PAK
Synthesizer Device	SSI-263	SC-01	SP-256	SC-01
Speaking Speeds	16	1	1	1
Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
Basic unit of Speech	64 phonemes 4 durations each	64 phonemes	64 allophones 5 pause lengths	64 phonemes
Pitch Variations	4096 (32 absolute levels with 8 inflection speeds)	4	1	4

FREE "REACTION" To Test Your Reflexes

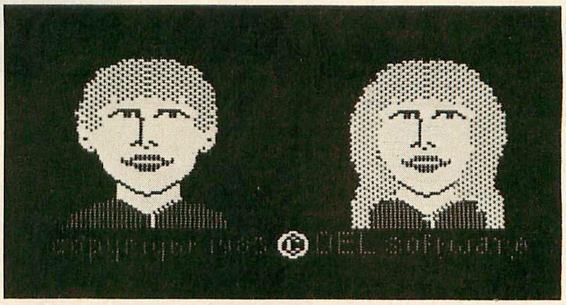
FREE SUPER VOICE SINGS THE STAR SPANGLED BANNER

FREE "SIMON" To Test Your Memory

FOOL'S CROSSING

The world's first TALKING HI-RES GRAPHICS adventure. Finding the hidden treasure is the easy part, getting back home is another story. FREE EARS to the first one to submit a solution.

32K Disk $24.95



SUPER TALKING HEADS

When the SUPER VOICE speaks in a low pitched voice, the man speaks, when a high pitched voice is used the woman speaks. $24.95

FREE BLANK DISK OR TAPE WITH EVERY ORDER

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
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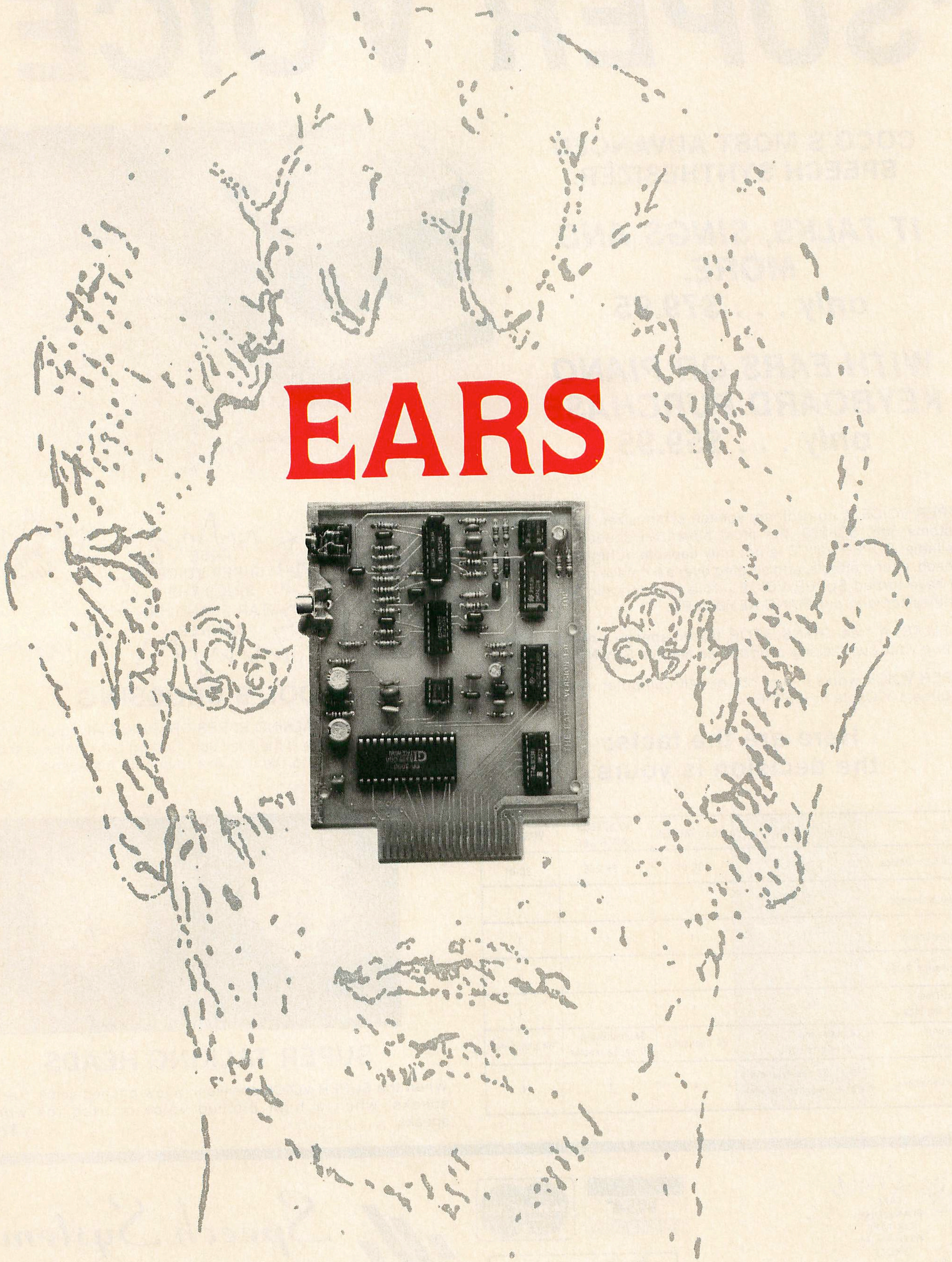
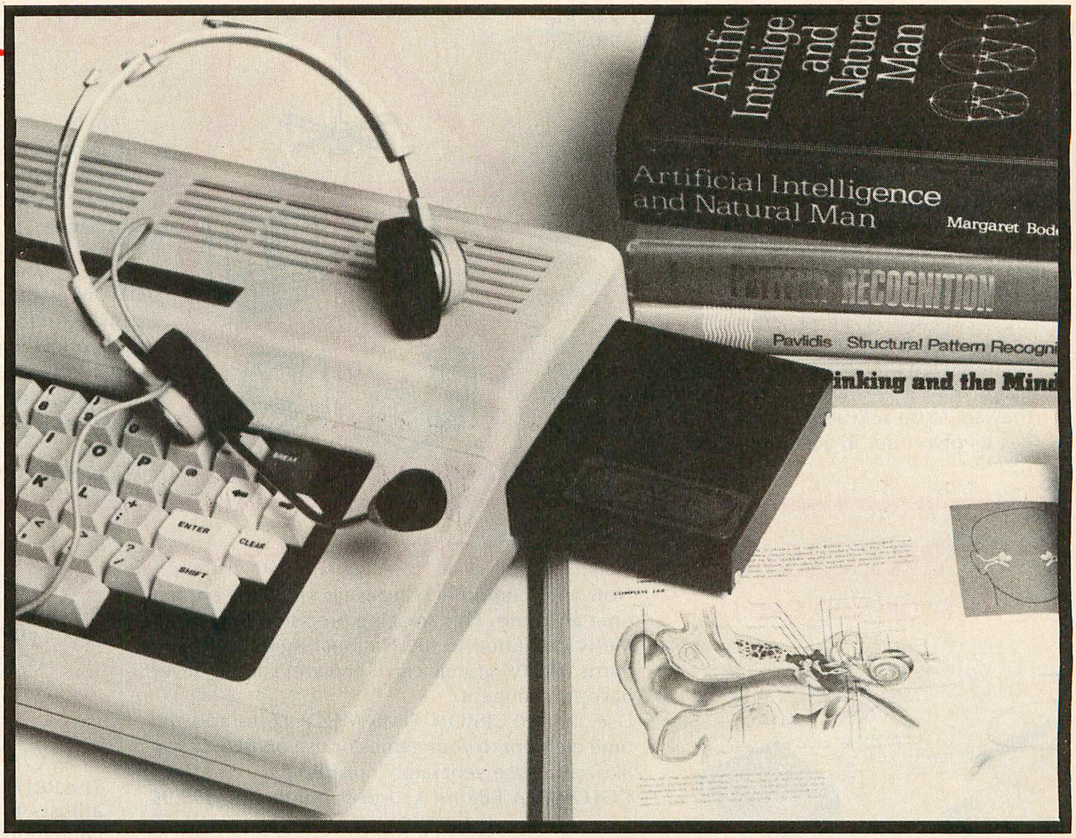

EARS
Electronic Audio Recognition System

EARS™

Electronic
Audio
Recognition
System

$99.95

Now Your
Computer
Can Listen
To You!



- SPEECH RECOGNITION
- HANDS OFF PROGRAMMING
- HIGH QUALITY SPEECH REPRODUCTION

EARS Does It All!

INCREDIBLE!

Two Years In the Making. Speech Systems was formed to develop new and innovative speech products. After 2 years of intensive Research and Development, we have created a truely sophisticated speech recognition device. Recognition rates from 95% to 98% are typical. Until now, such a product was outside the price range of the personnel computer market, and even small businesses.

EARS is trained by your voice and capable of recognizing any word or phrase. Training EARS to your particular voice print takes seconds. Up to 64 voice prints may be loaded into memory. You may then save on tape or disk as many as you like so that your total vocabulary is virtually infinite.

Speech and Sound Recognition. EARS is really a sound recognition system, so it really doesn't matter whether you speak in English, Spanish, or French. In fact you do not have to speak at all, you can train EARS to understand sounds such as a musical note or a door slamming.

Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that you would normally do through a keyboard can now be done by just speaking.

Programming EARS Is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN: MATCH will instruct EARS to listen to you and return the matching phrase.

It Talks. EARS is also capable of high quality speech. We mean REALLY high quality. The speech is a fixed vocabulary spoken by a professional announcer. Speech Systems is currently creating a library of thousands of high quality words and phrases. For a demonstration call **(312) 879-6844**, you won't believe your ears or our EARS.

DISK OWNERS. EARS will work with any disk system with either a MULTI-PAK or Y-CABLE. Our new Triple Y-CABLE was specifically developed for those wishing to add SUPER VOICE as a third device.

You Get Everything You Need. You get everything you need including a specially designed professional headset style noise cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

SUPER VOICE $20 OFF

Imagine talking to your computer and it talking back to you. When you need an unlimited vocabulary, you can't beat SUPER VOICE. For a limited time, we will give you the SUPER VOICE for $59.95 with your EARS purchase. Even if you already have another speech unit, here is your chance to buy the best and save $20.

VOICE CONTROL

Applications for EARS are astounding. Here is our first of many listening programs to come. VOICE CONTROL is a program specifically designed to allow you to control any appliance in your house with your voice and our HOME COMMANDER (sold separately). For example, you can control your TV by saying "TV ON" or TV OFF". $24.95

FREE
BLANK DISK
OR TAPE
WITH EVERY
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VISA® MasterCard

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We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
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'HOME COMMANDER'

$59.95

VOICE CONTROL
APPLIANCES
WITH EARS

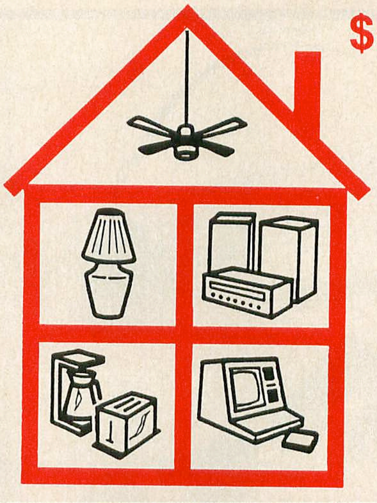
The HOME COMMANDER easily connects to the cassette port of your Color Computer and lets you control appliances in your home.

NO WIRES NECESSARY

The HOME COMMANDER uses your home's existing electrical wiring to control virtually anything. Appliances are controlled via small control modules available at your local SEARS or Radio Shack store.

ON FRIDAY 7:42 PM, OFF SUNDAY 1:26 AM

Included FREE is a program to allow you to control up to 256 devices and specify the time and date they are to be activated. That's right, the software has its own built in accurate clock.



Imagine controlling a light or TV with your voice. When used with our Electronic Audio Recognition System, EARS, you can literally control any appliance.

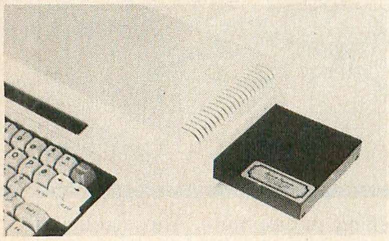
PLUG'N POWER USERS

If you were disappointed in the software that came with the Radio Shack PLUG'N POWER unit, and you probably were, we'll offer you our powerful software separately. An early version is described in the Feb., April, June, and August 1983 issues of RAINBOW. Our current version is even better. **$19.95**

PLUG'N POWER is a trademark of Radio Shack®

PRECISION TIME MODULE $59.95

— INCLUDES OS9 DRIVER —



THE
TIMEPIECE
FOR THE
COLORAMA
BBS

FREE
TALKING CLOCK
PROGRAM
requires VOICE,
SUPER VOICE,
or
SPEECH & SOUND PAK

Now your computer will always know the correct time and date. This amazing precision time module is calibrated to the National Bureau of Standards (WWV) atomic clock and you should never have to change it.

Use the PRECISION TIME MODULE to add the time element to your games or use on BBS. If you like, purchase separately our BBS.

COLORAMA BBS (64 K, 1 drive minimum) **$99.95**

BATTERY BACKUP

Even when your computer is off, the clock keeps correct time by operating using the internal battery backup system.

MONTHS, LEAP YEARS & DST

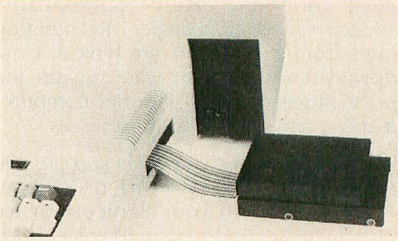
The PRECISON TIME MODULE automatically adjusts for the different number of days in each month as well as leap years. And believe it or not, it adjusts for DST so you don't have to remember if it's SPRING FORWARD or FALL FORWARD.

Y-CABLE $28.95

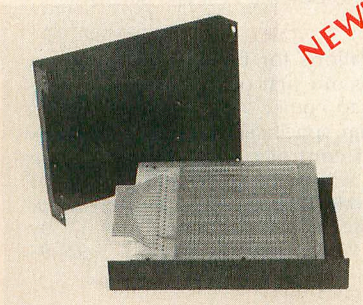
Why pay $100 to $200 for a multi-pak. With the Y-CABLE, you can connect your disk system to your computer along with either our STEREO PAK music synthesizer, our VOICE, SUPER VOICE speech synthesizers, or our PRECISION TIME MODULE. All connectors gold plated.

TRIPLE Y $34.95

We developed the Triple Y-Cable specifically for those interested in both speech synthesis and speech recognition. The Triple Y-Cable lets you connect EARS and SUPER VOICE to your color computer along with your disk system.



NEW! ATTENTION EXPERIMENTERS!



Interested in building your own project? Our oversized board gives plenty of room for construction while the sturdy aluminum case with black satin finish assures protection and a professional appearance.

Prototype Board only **$19.95**
Prototype Enclosure only **$19.95**
Buy both for **$29.95**

Advanced
Speech
Chip
SSI-263
(SC-02)
$34.95

Need an SC-01? **$29.00**

Disks .... (any quantity)	$1.49
Tape C-10, C-20	$0.69
Hard Tape Box	$0.29
6821	$2.95
74LS138	$0.79
7407	$0.79
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		81	136
12	221	91	15
24	57	104	135
35	237	116	73
50	73	130	151
69	24	END	79

The listing: HAM UTIL

```
1 CLS:Y=43:FORX=1024TO1055:POKEX
,Y:POKEX+480,Y:NEXT:FORX=1024TO1
535STEP32
2 POKEX,Y:POKEX-1,Y:NEXT:PRINT@1
97,"QSL CARD AND LOG PAGE";
3 PRINT@233,"PRINTER  COPY ";:PR
INT@451,"BY: ALAN HANUSIAK - WA1
HYF";:FORTM=1TO2000:NEXT
4 CLS:CLEAR10000:DIML(99):A$="*"
5 CLS:PRINTSTRING$(32,"*"):PRINT
TAB(7)"MAIN PROGRAM MENU":PRINT@
128,STRING$(32,"*")
6 PRINT"  1 - INPUT DATA FROM KE
YBOARD":PRINT@258,"2 - PRINT DAT
A"
7 PRINT@322,"3 - SAVE DATA TO TA
PE":PRINT@386,"4 - LOAD DATA FRO
M TAPE"
8 PRINT@457,"WHICH ONE";:INPUTR:
CLS:ON R GOTO9,32,107,113
9 CLS:PRINT@256,"STATION CALLED
(CALL OR <ENTER>)":PRINT@333,"";
:LINEINPUTR$:CLS
10 IFR$=""THENB$="X"+A$ELSEB$=R$
+A$
11 PRINT@258,"CALLED BY (<ENTER>
 OR CALL)":PRINT@333,"";:LINEINP
UTR$:CLS
12 IFR$=""THENC$="X"+A$ELSEC$=R$
+A$
13 IFL>0THENPRINT@69,"LAST ENTRY
 WAS "J$
14 PRINT@261,"DATE (XX-XX-XX) ";
:LINEINPUTR$:CLS:IFR$=""THENJ$=J
$ELSEJ$=R$
15 PRINT@264,"TIME (XXXX) ";:LIN
EINPUTP$:P$=P$+A$:CLS
16 PRINT@258,"HIS FREQ. (XXX.XXX
) ";:LINEINPUTQ$:Q$=Q$+A$:CLS:IF
L>0THENPRINT@69,"LAST ENTRY WAS
";U$
17 PRINT@258,"MY FREQ. (XXX.XXX)
 ";:LINEINPUTR$:CLS:IFR$=""THENU
$=U$ELSEU$=R$
18 PRINT@260,"HIS SIGNAL RST (XX
X) ";:LINEINPUTS$:S$=S$+A$:CLS
19 PRINT@259,"MY SIGNAL RST (XXX
) ";:LINEINPUTT$:T$=T$+A$:CLS:IF
L>0THENPRINT@71,"LAST ENTRY WAS
";V$
20 PRINT@261,"MY POWER - WATTS "
;:LINEINPUTR$:CLS:IFR$=""THENV$=
V$ELSEV$=R$
21 PRINT@257,"TIME OF ENDING QSO
 (XXXX) ";:LINEINPUTW$:W$=W$+A$:
CLS
22 IFL>0THENPRINT@71,"LAST ENTRY
 WAS ";H$
23 PRINT@263,"EMISSION TYPE (XX)
 ";:LINEINPUTR$:CLS:IFR$=""THENH
$=H$ELSEH$=R$
24 PRINT@260,"QSL SENT (Y OR <EN
TER>) ";:LINEINPUTK$:K$=K$+A$:CL
S
25 PRINT@257,"QSL RECEIVED (Y OR
 <ENTER>) ";:LINEINPUTL$:L$=L$+A
```

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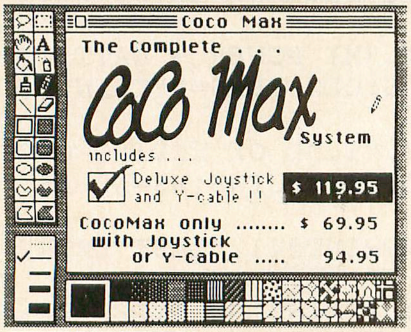

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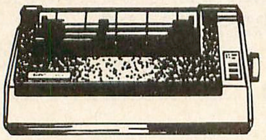

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```
$:CLS
26 PRINT@258,"FOR QSL CARD (PSE
OR TNX) ";:LINEINPUTF$:F$=F$+A$:
CLS
27 PRINT@263,"HIS NAME ";:LINEIN
PUTM$:M$=M$+A$:CLS
28 PRINT@259,"OTHER DATA ";:LINE
INPUTN$:N$=N$+A$:CLS
29 G$(L)=B$+C$+J$+A$+P$+Q$+U$+A$
+S$+T$+V$+A$+W$+H$+A$+K$+L$+F$+M
$+N$
30 PRINT@258,"IS THIS LAST ENTRY
 (Y OR N) ";:LINEINPUTR$
31 L=L+1:E=L:IFR$="Y"THEN5ELSE9
32 E=L:CLS:PRINTSTRING$(32,"*"):
PRINTTAB(6)"PRINTER PROGRAM MENU
"
33 L=0:PRINT:PRINTSTRING$(32,"*"
):PRINT@230,"1 - PRINT QSL CARDS
"
34 O$=CHR$(27):PRINT@294,"2 - PR
INT LOG PAGE":PRINT@358,"3 - END
 OF PRINTING"
35 Z$=CHR$(150):PRINT@425,"WHICH
 ONE ";:INPUTR:CLS:IFR=3ORE=0THE
N5
36 CLS:PRINTSTRING$(32,"*"):PRIN
T"  THERE ARE"E"ENTRIES TO PRINT
":PRINT@128,STRING$(32,"*")
37 PRINT@296,"SET PAPER TO TOF"
38 PRINT@420,"";:LINE INPUT"PRES
S <ENTER> WHEN READY";R$:CLS:IFR
=1THEN44
39 PRINT@231,"FOR LOG PAGE ENTER
":PRINT@294,"";:INPUT"STARTING L
INE NUMBER";M
40 PRINT#-2,O$"Q":IFM=1THEN121
41 FORB=1TO25:PRINT#-2,CHR$(10)
42 IFB=2THENPRINT#-2ELSEIFB<2THE
NPRINT#-2,CHR$(10)
43 IF B=M THEN44ELSENEXT
44 IFE=0THEN32ELSECLS:PRINT@264,
"SORTING ENTRIES":R$="":D=1:E=E-
1
45 FORA=1TOLEN(G$(L)):D$=MID$(G$
(L),A,1):IFD$<>A$THENR$=R$+D$:NE
XT
46 ON D GOSUB47,48,49,50,51,52,5
3,54,55,56,57,58,59,60,61,62:R$=
"":D=D+1:NEXT
47 B$=R$:RETURN
48 C$=R$:RETURN
49 J$=R$:RETURN
50 P$=R$:RETURN
51 Q$=R$:RETURN
52 U$=R$:RETURN
53 S$=R$:RETURN
54 T$=R$:RETURN
```

LET US ENTERTAIN YOU!

A) FRANCHISE by Steve Hartford Have you watched chain stores pop up all around & wondered what it would be like to own, operate, and expand your own franchise? This is your chance to test your business savvy!

You begin with just one "Frank's" fast food restaurant but plan to expand rapidly! In the beautiful graphics of your office, you review last week's financial statements. Study your total gross sales from all stores, your expenses (advertising, food, labor, equipment, etc.), net income, & bank balance. Now make your management decisions that will affect (positively or negatively) next week's financial statement!

If the market is right, you may sell another franchise which will increase income. You'll also scope out the competition. McBurger and Taco Plus will surely try to squeeze you out!

But business isn't that easy! There are lots of little complications – like health department inspections that can close a restaurant if the food quality drops too low! And from time to time, you will have to help out at a restaurant. In arcade style action, you serve customer orders & how well you do affects customer satisfaction!

Franchise challenges the mind, pleases the eye with beautiful graphics, & tests the coordination with extra arcade interludes. Because this is a simulation of business & you make the decisions, it is different every time you play!

Requires 64K & joystick **Cass $24.95 Disk $27.95**

B) VOX CHESS by David Crandall Vox Chess is always an eager opponent to test your chess skills against. You'll enjoy the superb graphics and, if you have any of the voice paks that use the SC01 chip (Spectrum Projects, Speech Systems, Real Talker), Vox Chess will talk to you! You'll also appreciate the extra features like self-play, save & load previous games, set up a board layout, & exchange sides. Vox Chess is not the best player, so if you're already an expert, you may be able to beat him. For the beginner or even intermediate chess player, he'll give you a good contest. And for everyone, the graphics & speech are great fun!

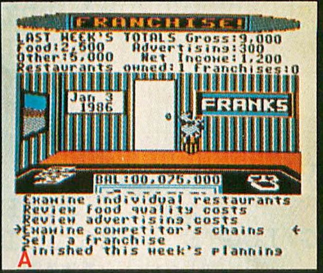
Requires 32K **Cass $21.95 Disk $24.95**

C) STAR TRADER by Steve Hartford Step into the business world of the future and become captain of a merchant starship. From the safety of your Color Computer, you control your ship with joystick (or mouse) in hand. Your graphic cockpit shows read-outs of your location, current damage status, credit balance, cargo destination and due date, the location of any nearby starships, fuel and laser power levels, and the current date. Traveling between distant solar systems, you pick up cargo, deliver cargo, (maybe steal cargo or sell it on the black market), battle pirate ships, and best of all, make money! As you battle and travel, you develop a reputation that will affect your future business and rewards.

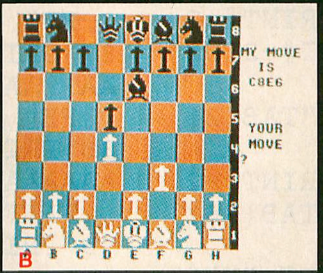
With different skill levels and many variable factors, this graphic simulation offers the excitement and challenge of a new game every time you play.

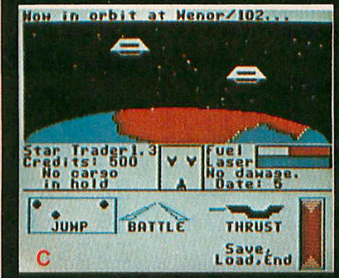
Requires joystick or mouse and 32K for cassette or 64K for disk.
Cass $24.95 Disk $27.95

To order: Add $2 for shipping surface. Add $5 for air/Canada.

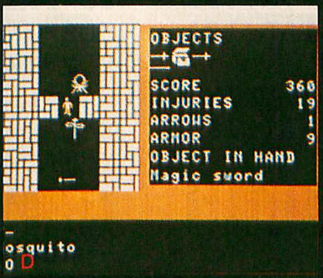


```
FRANCHISE!
LAST WEEK'S TOTALS Gross:9,000
Food:2,600   Advertising:300
Other:5,000   Net Income:1,200
Restaurants owned:1 franchises:0
BAL:00,076,000
 Examine individual restaurants
 Review food quality costs
 Review advertising costs
→Examine competitor's chains   ←
 Sell a franchise
 Finished this week's planning
```

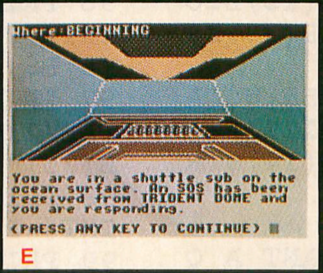




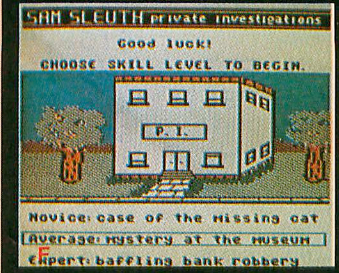
```
Now in orbit at Henor/102...
Star Trader1.3
Credits: 500
No cargo
in hold
Fuel
Laser
No damage.
Date: 6
```



```
OBJECTS
SCORE          360
INJURIES        19
ARROWS           1
ARMOR            9
OBJECT IN HAND
Magic sword
-
osquito
0
```



```
Where:BEGINNING
You are in a shuttle sub on the
ocean surface. An SOS has been
received from TRIDENT DOME and
you are responding.
(PRESS ANY KEY TO CONTINUE)
```



```
SAM SLEUTH private investigations
Good luck!
CHOOSE SKILL LEVEL TO BEGIN.
Novice: case of the missing cat
Average: mystery at the museum
Expert: baffling bank robbery
```

D) DUNGEON QUEST by Steve Seiden Long ago, in a magic age, there lived a brave young lad named Brodric. When he came of age, his father gave him his share of the inheritance, an old rusty sword, & Brodric set out into the world. He heard a legend of an emperor of old, Darius, who had built a subterranean fortress as his home. Darius' empire, however, was short-lived as he died of plague only a few short years after his coronation. On his deathbed, Darius decreed that *since he had no heir,* whoever would possess the crown would rule the empire.

Brodric decided to go on a quest for the crown. A fortnight or more later, Brodric reached the entrance to the fortress dungeon. He unsheathed his sword & stepped inside. Not five steps later, the floor gave way & sent him tumbling downward . . . Brodric awoke, picked up his sword, & set out to find the crown!

You see Brodric on your screen searching the passageways for the crown. As you guide him with your joystick, you earn points by gathering valuable objects like jewels & chalices, & battle the many monsters that inhabit the dungeon. Can you bring Brodric safely to the crown & earn the rank of Emperor for yourself?

Requires 32K & joystick **Cass $24.95 Disk $27.95**

E) MAJOR ISTAR (Under the Doomed Sea) by BJ Chambless **SCENARIO:** You travel to Trident Research Dome because an urgent call for help is received from one of the service droids stationed there. He said help was urgently needed, but before he could say why, his transmission was cut off!

OBJECT: Solve the mystery at Trident in as few moves as possible.

SETTING: In the beginning of the 21st century undersea cities, interstellar spaceships, colonies in other planets and solar systems, worker droids, super computers, are all realities. One hero of the time is Major Istar. In the late 1990's, when space exploration and colonies began, it was necessary to form a task force to offer help to all that needed it in these hostile environments. You, Cameron J. Istar, are a highly rated member of that team and you have never failed to solve a mystery!

This is a graphics adventure like no other. There are 101 rooms, 33 objects, and 3 arcade sequences! It requires imagination, hand-eye coordination, logic, a sense of humor, and the willingness to take on a challenge!

Requires 64K & joystick **Cass $24.95 Disk $27.95**

F) SAM SLEUTH by Steve Hartford *It was my first case* & I was a little disappointed. I didn't become a private eye to find lost cats. But the lady was right when she said "you don't look overworked." Shirley said that her friends had gone on vacation & left her to care for their cat. All was fine until this morning when she found the porch door open & the cat gone. Her friends were due back today!

I quickly learned the rules around this town of Elmsville. Reputation really played a part here. And not everyone exactly told the truth or were what I'd call cooperative. Judgement had to be my guide . . .

The next cases came quicker but were much harder to solve. Mr. Atherns was really upset when that ancient Mayan statue was stolen from his museum. I think the lapse of his insurance really put the heat on. And then I worked with good ole Sheriff Walker on the town bank robbery.

Sam Sleuth is a graphic simulation that will intrigue all. You'll enjoy the beautiful graphics as you guide Sam around town with the mouse or joystick. The three mysteries get progressively harder & each will change every time you play, giving endless challenge and fun.

Requires 64K & joystick or mouse **Cass $24.95 Disk $27.95**

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```
55 V$=R$:RETURN
56 W$=R$:RETURN
57 H$=R$:RETURN
58 K$=R$:RETURN
59 L$=R$:RETURN
60 F$=R$:RETURN
61 M$=R$:RETURN
62 N$=R$
63 L=L+1:F=VAL(Q$):H=VAL(V$):G=V
AL(U$):IFR=1THEN78
64 CLS:PRINT@262,"PRINTING LOG E
NTRIES"
65 PRINT#-2,TAB(14)"*";:PRINT#-2
,TAB(15)Z$TAB(17)"";:PRINT#-2,US
ING"##";M;
66 PRINT#-2,TAB(20)Z$O$"X"TAB(26
)P$;TAB(33)Z$;
67 IFB$="CQ"ORB$="X"THENPRINT#-2
,TAB(38)B$;:ELSEPRINT#-2,TAB(36)
B$;
68 PRINT#-2,TAB(43)Z$;:IFC$="X"T
HENPRINT#-2,TAB(48)C$;:ELSEPRINT
#-2,TAB(46)C$;
69 PRINT#-2,TAB(53)Z$;:IFB$="CQ"
THEN70;:ELSEPRINT#-2,TAB(55)"";:
PRINT#-2,USING"###.###";F;
70 PRINT#-2,TAB(63)Z$TAB(67)S$TA
B(73)Z$TAB(77)T$TAB(83)Z$TAB(85)
"";
71 PRINT#-2,USING"###.###";G;:PR
INT#-2,TAB(93)Z$TAB(97)H$TAB(101
)Z$TAB(103)"";
72 PRINT#-2,USING"####";H;:PRINT
#-2,TAB(109)Z$TAB(112)W$TAB(119)
Z$TAB(121)K$;
73 PRINT#-2,TAB(123)Z$TAB(125)L$
TAB(127)O$"Y"TAB(129)Z$TAB(130)"
*"
74 PRINT#-2,TAB(14)"*"TAB(15)Z$O
$"X"TAB(22)Z$TAB(24)J$;TAB(33)Z$
TAB(37)M$;
75 PRINT#-2,TAB(53)Z$TAB(55)N$TA
B(127)O$"Y"TAB(128)Z$TAB(129)"*"
76 IFM=25THENPRINT#-2,TAB(14)STR
ING$(113,"*"):GOTO36
77 M=M+1:GOTO44
78 CLS:PRINT@69,"DO YOU WANT A Q
SL CARD":PRINT@135,"FOR THIS LOG
 ENTRY"
79 PRINT@192,STRING$(32,"-"):PRI
NTTAB(5)"STATION CALLED  ";:IFB$
="X"THENPRINT"ME"ELSEPRINTB$
80 PRINT@325,"CALLED BY       ";
:IFC$="X"THENPRINT"ME"ELSEPRINTC
$
81 PRINT@384,STRING$(32,"-"):PRI
NTTAB(11):LINEINPUT"( Y OR N ) "
;R$:IFR$="N"THEN44
82 CLS:PRINT@262,"PRINTING QSL C
ARD":PRINT#-2,O$"N":PRINT#-2,CHR
$(14)
83 PRINT#-2,TAB(2)"AMATEUR RADIO
 STATION";:PRINT#-2,CHR$(15);
84 PRINT#-2,O$"E";:PRINT#-2,O$"T
15":PRINT#-2,O$"["
85 PRINT#-2," WW              WW
  AA       111  HH  HH  YY    YY
  FFFFFF"
86 PRINT#-2,"  WW            WW
 AAAA     1111  HH  HH   YY  YY
  FF"
87 PRINT#-2,"   WW    WW    WW
AA  AA      11  HH  HH    YYYY
  FF"
88 PRINT#-2,"    WW  WWWW  WW  A
AAAAAAA     11  HHHHHH     YY
  FFFF"
89 PRINT#-2,"     WWWW  WWWW  AA
      AA    11  HH  HH     YY
  FF"
90 PRINT#-2,"      WW    WW  AA
       AA   11  HH  HH     YY
  FF"
91 PRINT#-2,O$"A"
92 PRINT#-2,TAB(18)"Confirming t
he QSO with:":PRINT#-2,TAB(1)STR
ING$(58,"*")
93 PRINT#-2," *"O$"X""  STATION
"O$"Y"TAB(11)"*"O$"X""  TIME  "O
$"Y"TAB(20)"*";
94 PRINT#-2,O$"X""  DATE    "O$"
Y"TAB(31)"*"O$"X""  FREQ.   "O$"
Y"TAB(40)"*";
95 PRINT#-2,O$"X"" R/S/T "O$"Y"T
AB(48)"*"O$"X"" MODE "O$"Y"TAB(5
7)"*""
96 PRINT#-2," *";:IFB$="X"THENPR
INT#-2,TAB(5)C$;ELSEPRINT#-2,TAB
(5)B$;
97 PRINT#-2,TAB(12)"*"TAB(15)P$;
TAB(21)"*"TAB(23)J$;TAB(32)"*"TA
B(35)"";
98 PRINT#-2,USING"###.###";F;:PR
INT#-2,TAB(43)"*"TAB(46)S$;
99 PRINT#-2,TAB(51)"*"TAB(54)H$;
TAB(58)"*":PRINT#-2,TAB(1)STRING
$(58,"*")
100 PRINT#-2,TAB(4)"Alan Hanusia
k - WA1HYF"TAB(42)"Heathkit HW-1
6"
101 PRINT#-2,TAB(5)"37 Grand Ave
nue"TAB(38)"30' Trap Vertical"
102 PRINT#-2,TAB(5)"Rockville, C
T 06066";:PRINT#-2,TAB(45)"";
103 PRINT#-2,USING"#### Watts";H
:PRINT#-2,TAB(5)"Tolland County"
```

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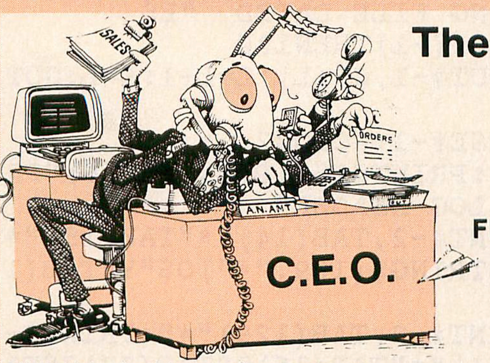

With this desktop software your CoCo becomes your own personal administrative assistant. Load C.E.O. first thing each workday and everything you need is at your fingertips! Screens are shown in an easy-to-read 51x24 hires display with upper and lower case. The Macintosh-like icons (pictures for commands) make it simple and fun to be organized, efficient, and on time!

DATE BOOK:
You'll never miss an important occasion again! C.E.O.'s calendar stores an entire year's appointments. Each day has entries for one special occasion, one memo, and hourly notes for 8 am to 5 pm. You can display or print any daily schedule or a whole week at a time.

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A full four function calculator is at your fingertips!

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C.E.O.'s free-form data base keeps your important info a few keystrokes away. Just type in your notes (up to 4600 characters with a 48 character title line) the same way you'd jot them down on a scratch pad. Your notes will be neatly organized and saved for instant retrieval! The sophisticated keyword search can scan all of the titles for any occurrence of a given phrase, making it easy to find notes on any topic. And there's room for alot of info—up to 479 entries can be stored on the data disk!

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```
;
104 PRINT#-2,TAB(43)"TNX QSO - 7
3":PRINT#-2,TAB(5)"U. S. A."TAB(
48)F$;TAB(51)" QSL"
105 PRINT#-2,TAB(4)"TRS 80 Color
 Computer     -    C.Itoh 8510 P
rowriter"
106 PRINT#-2,CHR$(27)"]":IFE=0TH
EN32ELSECLS:GOTO36
107 PRINT@201,"POSITION TAPE":PR
INT@259,"PRESS <PLAY> AND <RECOR
D>"
108 PRINT@324,"";:LINE INPUT"PRE
SS <ENTER> WHEN READY";R$:CLS
109 PRINT@200,"ENTER FILE DATE":
PRINT@268,"";:LINEINPUTE$
110 PRINT@329,"RECORDING FILE":L
=0:OPEN"O",#-1,E$
111 PRINT#-1,G$(L):L=L+1:IF L=E
THEN112ELSE111
112 CLOSE#-1:GOTO5
113 PRINT@256,"  POSITION TAPE -
 PRESS <PLAY>"
114 PRINT@324,"";:LINEINPUT"PRES
S <ENTER> WHEN READY";R$
115 CLS:PRINT@196,"ENTER FILE DA
TE WANTED"
116 PRINT@267,"";:LINEINPUTE$:PR
INT@326,"SEARCHING FOR FILE"
117 L=0:OPEN"I",#-1,E$:PRINT@322
,"LOADING FILE DATED  "E$
118 IFEOF(-1)THEN120
119 INPUT#-1,G$(L):L=L+1:E=L:GOT
O118
120 CLOSE#-1:GOTO32
121 CLS:PRINT@250:PRINTTAB(6)"PR
INTING LOG HEADER"
122 PRINT#-2,TAB(14)"*"TAB(15)"*
"O$"X"STRING$(109,"*")O$"Y"TAB(1
28)"*";
123 PRINT#-2,TAB(129)"*":PRINT#-
2,TAB(14)"*"TAB(15)Z$TAB(20)Z$TA
B(31)Z$TAB(33)"STATION";
124 PRINT#-2,TAB(41)Z$TAB(51)Z$T
AB(55)"HIS"TAB(61)Z$TAB(65)"HIS"
TAB(71)Z$TAB(76)"MY";
125 PRINT#-2,TAB(81)Z$TAB(91)Z$T
AB(93)"EMIS-"TAB(99)Z$TAB(101)"P
OWER";
126 PRINT#-2,TAB(107)Z$TAB(109)"
TIME OF"TAB(117)Z$TAB(125)Z$TAB(
126)"*"
127 PRINT#-2,TAB(14)"*"TAB(15)Z$
TAB(20)Z$TAB(24)"TIME"TAB(31)Z$T
AB(34)"CALLED";
128 PRINT#-2,TAB(41)Z$TAB(44)"CA
LLED"TAB(51)Z$TAB(54)"FREQ/"TAB(
61)Z$;
129 PRINT#-2,TAB(63)"SIGNALS"TAB
(71)Z$TAB(73)"SIGNALS"TAB(81)Z$;
130 PRINT#-2,TAB(85)"MY"TAB(91)Z
$TAB(93)"SION"TAB(99)Z$TAB(101)"
INPUT";
131 PRINT#-2,TAB(107)Z$TAB(109)"
ENDING"TAB(117)Z$TAB(119)"QSL'S"
TAB(125)Z$TAB(126)"*"
132 PRINT#-2,TAB(14)"*"TAB(15)Z$
O$"X"TAB(22)Z$TAB(26)"DATE"TAB(3
3)Z$;
133 PRINT#-2,TAB(36)"NAME"TAB(43
)Z$TAB(48)"BY"TAB(53)Z$TAB(56)"I
NFO"TAB(63)Z$;
134 PRINT#-2,TAB(67)"RST"TAB(73)
Z$TAB(77)"RST"TAB(83)Z$TAB(86)"F
REQ."TAB(93)Z$;
135 PRINT#-2,TAB(95)"TYPE"TAB(10
1)Z$TAB(103)"WATTS"TAB(109)Z$TAB
(113)"QSO";
136 PRINT#-2,TAB(119)Z$TAB(121)"
S"TAB(123)Z$TAB(125)"R"TAB(127)O
$"Y"TAB(128)Z$TAB(129)"*"
137 PRINT#-2,TAB(14)"*"TAB(15)"*
"O$"X"TAB(16)STRING$(109,"*");
138 PRINT#-2,TAB(127)O$"Y";TAB(1
28)"*"TAB(129)"*":GOTO44
```

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Harvesting Summer's Bumper Crop Of BBSs

. . . Including a new board that has just "sprung up" from "Down Under"

By R.Wayne Day
Rainbow Contributing Editor

This summer turned out to be quite interesting from a telecommunications standpoint, with several intercontinental BBS exchanges going on and just oodles of new "domestic" boards going online.

It all started this July when a caller logged on to TBBS Fort Worth from Sydney, New South Wales, Australia, roughly the farthest point you can get from Fort Worth.

Gerd Oblack, an active OS-9 user and CoCo telecommunicator, wanted to check out the BBS action stateside a bit and let us know what was happening "Down Under." Gerd, who is a member of the New South Wales OS-9 Users Group in Sydney, was able to make a few contacts with the OS-9 users on TBBS.

Graeme Nichols is the SysOp of the NSW OS-9 BBS, which has been operating on Tuesday and Thursday from 7 p.m. to 9 p.m. (Sydney time) for the locals.

I got up real early (3 a.m. Central time) one Monday morning (Australia lies across the International Dateline, so when it's Monday in the United States, it's Tuesday in Australia) and placed the international call. A short while later, after getting the modem standards set up, I was able to spend a little bit of time browsing around the Sydney group's BBS!

That initial success brought about this note from Graeme . . .

"It was great to receive your call from Fort Worth the other night. Just sitting watching my CoCo go through its paces with disk drives whirring and modem lights flashing whilst it talked with your CoCo really drives home just how powerful it is.

"When the other members of the Group were told, they were just as excited and were hopeful that your upcoming article on our BBS will result in some more calls from the U.S.A.

"To this effect, I would like to suggest that 8 a.m. to 12 noon Saturday, local time (in Sydney) would be a convenient time for OS-9 users in the U.S. to call our BBS. I will leave it online with Bell 103 standard, 300 Baud, eight bits, no parity and one stop bit. Unfortunately, my modem cannot handle 1200 Baud FDX (Bell 212 standard), but it can handle CCITT 1200/75 Baud (European standard). That is the standard for our public utility information network, Viatel.

"Please let me know if this is a worthwhile proposition."

By all means, Graeme, I think it's a *smashing* idea (hmmm . . . I may have picked up a bit of the Australian lingo on that call).

So, if you think you would like to invest a couple of dollars in a *real* long-distance call, Graeme's board is available at 61-02-451-2954. Australia's country code for long distance calling is "61" and the city code, much like an area code in North America, is "02."

Is it real expensive to call halfway around the world? A check with AT&T shows that charges for that time of the day run from a high of about $16 to $12 for a 10-minute call, directly dialed. If you're an MCI customer, the appropriate discounts apply to those charges.

During the time when Daylight Savings Time is still in effect in the United States, the times to call are:

Eastern Daylight 6 p.m. - 10 p.m.
Central Daylight 5 p.m. - 9 p.m.
Mountain Daylight 4 p.m. - 8 p.m.
Pacific Daylight 3 p.m. - 7 p.m.

At the same time that North America drops off Daylight Savings time, Australia begins their summer, and Daylight Savings Time, so after November 1, the times are:

Eastern Standard 4 p.m. - 8 p.m.

(Wayne Day, a traffic engineering technician for the city of Fort Worth, Texas, is the SysOp of The Color SIG on CompuServe, the oldest CoCo communications service in the nation. Active in emergency medicine as a paramedic, he is also an amateur radio operator [WA5WDB].)

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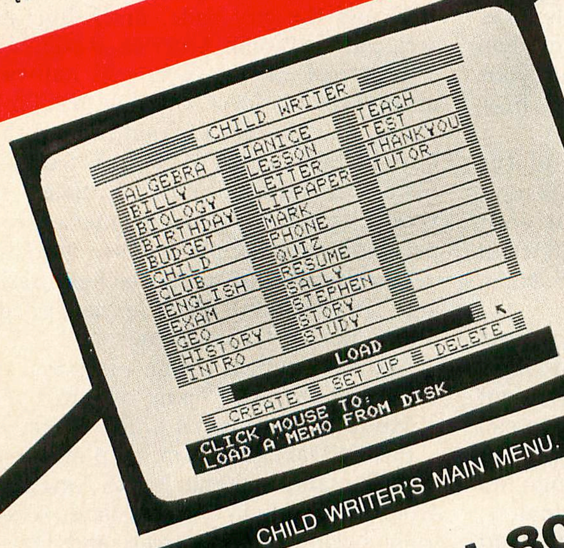
CHILD WRITER
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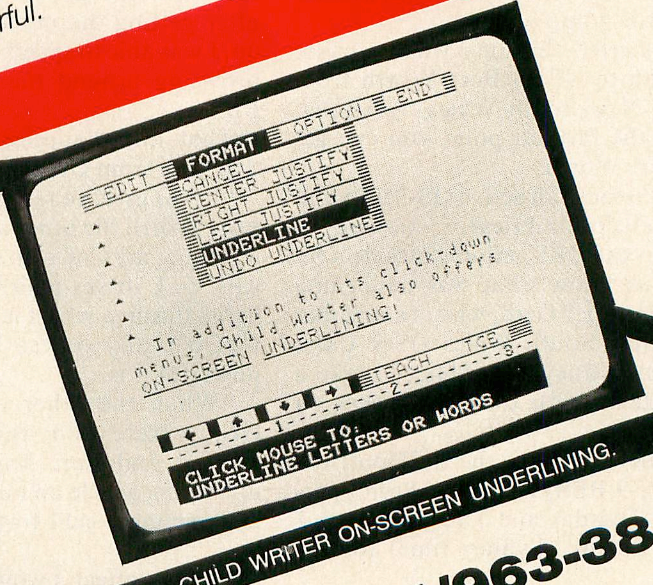
BILLY
BIOLOGY
BIRTHDAY
BUDGET
CHILD
CLUB
ENGLISH
EXAM
GEO
HISTORY
INTRO
JANICE
LESSON
LETTER
LITPAPER
MARK
PHONE
QUIZ
RESUME
SALLY
STEPHEN
STORY
STUDY
TEACH
TEST
THANKYOU
TUTOR
LOAD
DELETE
CREATE
SET UP

CLICK MOUSE TO:
LOAD A MEMO FROM DISK

CHILD WRITER'S MAIN MENU.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FORMAT
OPTION
END
CANCEL
CENTER JUSTIFY
RIGHT JUSTIFY
LEFT JUSTIFY
UNDERLINE
UNDO UNDERLINE
TEACH
TCE
1
2
3

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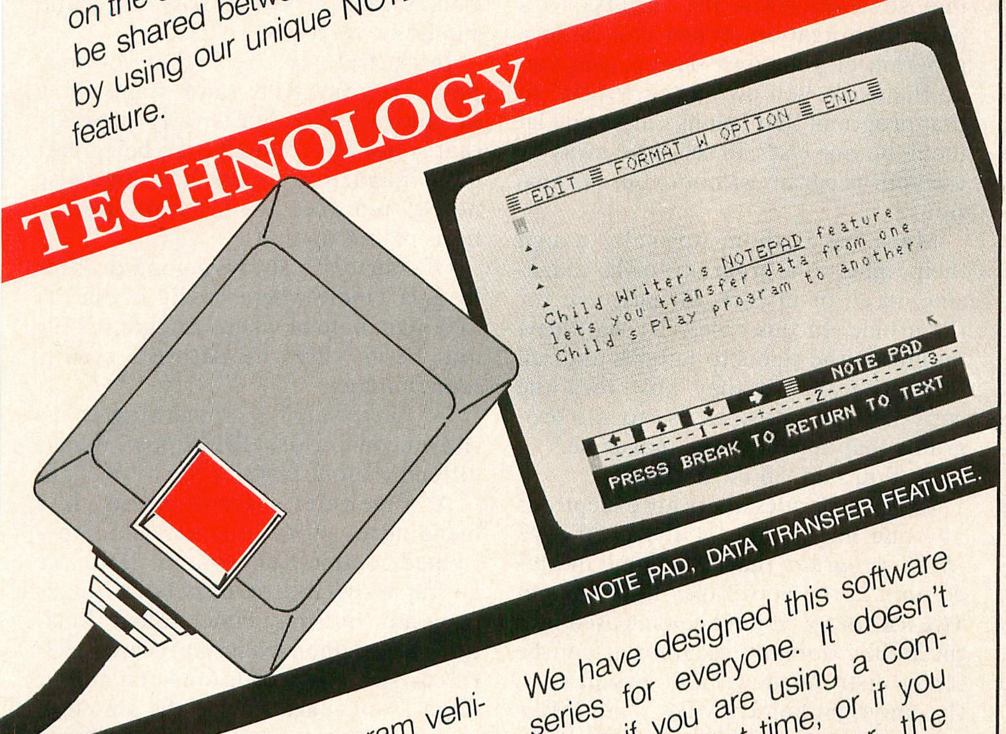
EDIT ≡ FORMAT W OPTION ≡ END ≡
Child Writer's NOTEPAD feature lets you transfer data from one Child's Play program to another.
NOTE PAD
PRESS BREAK TO RETURN TO TEXT

NOTE PAD, DATA TRANSFER FEATURE.

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Software Exchange

One of the byproducts an active BBS'er tends to collect is a good idea of what the "other guy" is doing in regard to home-grown software (the non-commercial type), since most BBSs have a database of various public domain programs. Though calling each and every BBS is the only way to guarantee that you'd have available everything there is to see, a public domain software exchange, coordinated through your local BBS, can be the next best thing.

TBBS Fort Worth and the Sydney OS-9 Users Group have, for example, exchanged copies of our public domain software by the time you read this. Though obviously not all of the software would be applicable (I couldn't bear to fill out an Australian Income Tax form, for example), programming styles and tricks are very worthwhile study materials.

If there's enough interest in doing something organized, perhaps BBS operators could get together, informally, and exchange names and addresses of systems willing to share their public domain programs.

What I envision right now is a mimeographed list of those BBSs wanting to get in on the software exchange. It would be up to the SysOp to make the initial contact with the other system and make arrangements for the exchange.

What do you think? Is there enough interest to start it — and keep it going?

Meanwhile, if you're interested in exchanging public domain programs with the Sydney OS-9 Group, contact:

Graeme Nichols
Sydney OS-9 Users Group
9 Milham Crescent
Forestville, 2087
New South Wales, Australia

And with that, we have the perfect lead-in as we try to answer some common questions from RAINBOW readers.

Questions, Questions . . .

Q: Can I put up programs from THE RAINBOW on my BBS, and what do you mean by "Public Domain"?

A: First, let's define "copyright." A copyright on a program simply means that someone owns the "rights" to a particular creation. When you build a program of your own design, and you do the work, you own a "copyright" to that program; that means unless you let them, no one else can sell, give away or use your program without your permission.

Magazine authors normally assign their rights to a program to the magazine, in all or in part, for payment for the article. In this case, THE RAINBOW purchases the rights to publish and sell that program, so they now own the copyright, in most cases, to all programs that appear in the magazine.

Q: You said "in most cases"?

A: As in all rules, there are exceptions . . . one might look at the *OCNVRT .BAS* program that appeared in this column in the September 1985 issue of THE RAINBOW. It has been released into the public domain, meaning it can be freely distributed without payment to the copyright holder, Mike Ward. Mike gave us permission to include the program in the column, so we could share it with anyone who had a need for it.

The important thing to note, though, is that programs like this are the exceptions to the rule, rather than the norm.

Q: So, public domain means that "all is fair"?

A: Yes, and no.

Public domain is normally meant to say that you can use a particular program for personal use, but you may not sell it or make any charge for using the program. It may be freely distributed, however.

Some authors of public domain programs place restrictions on their programs, though, such as allowing it to be downloaded from one particular BBS or Information Service. Such restrictions are not tacked on frivolously and should be respected.

In general, the rule is that you may post on your BBS (and share on a person-to-person basis) any program that is not copyrighted (like being part of a magazine, unless it's otherwise noted) and does not have any restrictions placed upon it.

Of course, it's always a good practice to give credit where credit is due by making a note of where you got the file and being sure the author's credits remain intact.

Q: "Freeware" is something that's showing up on local BBSs now. What's different about that?

A: Freeware, shareware, etc., is a blending of public domain and copyrighted commercial prorams. Here, the author allows the free distribution of his program, but may either solicit donations based upon whatever the user feels the program is worth (and the author might even suggest a specific amount), or in other cases, the version being

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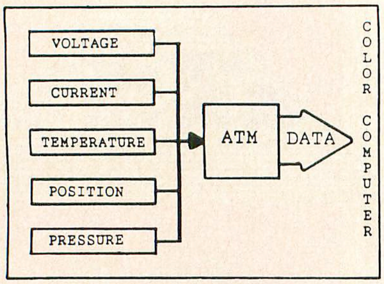

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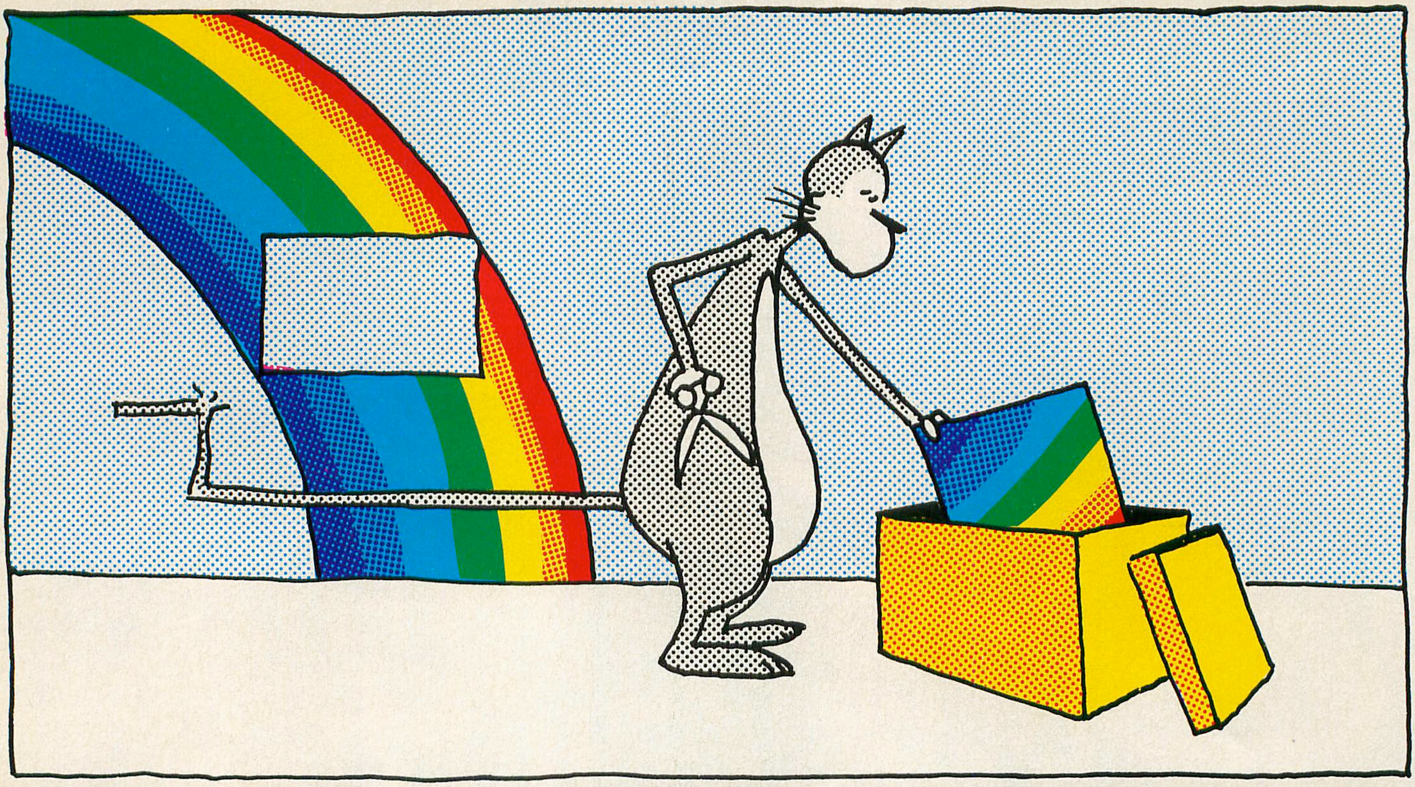
Rochester, New York 14624
Telephone: (716) 235-8358

Ordering Information: Specify model (Original, F-version, or CoCo 2). Payment by C.O.D., check, MasterCard or Visa. Credit card customers include complete card number and expiration date. Add $2.00 for shipping ($3.50 for Canada). New York state residents add 7% sales tax. Dealer inquiries invited.



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distributed is a stripped-down version, which might not do all the things a registered (purchased) version might do.

In any event, software such as this is commercial — it's just that the marketing effort has been redirected from being the traditional package in a store that is advertised in a magazine, to one that is freely distributed among potential customers.

As such, noting any restrictions found in the program or documentation, freeware is normally OK to post on your BBS.

Q: Why this emphasis on public domain programming? Does anyone really care what's in a database on some BBS out in the boondocks?

A: You better believe that a *lot* of folks really care, for two reasons . . .

Putting commercial programs up on a BBS is theft, pure and simple. It's immoral, it's illegal and what's probably worse, in the view of many folks, it fosters the misconception that many computer newcomers and old hands alike may think "it doesn't really hurt anyone."

It *does* hurt, not only the vendor who has lost a sale, but also the operator of the BBS who becomes known as a software thief. It hurts by creating a public misconception of what BBS systems are all about, as well as possibly hurting all BBS users who are beginning to face the threat of legislation that might well regulate some aspects of our hobby.

Secondly, public domain (or public programming as some call it) is probably the purest form of personal computing in existence today.

As Charles Bowen mentioned in *Online Today* in an essay on the subject of public programming, it ". . . promises to make us more self-sufficient consumers with tougher demands on the marketplace for quality, and that's in the truest spirit of personal computing."

Speaking of the Law

The first day of September brought about many changes in the laws of the State of Texas, but what caught most telecommunicators' eye was the newest "Computer Crime" law in the country.

Basically, the new law (Chapter 33, Title 7 of the Texas Penal Code) provides criminal liabilities under two categories of actions: defeating a security system (password protection, for example) or assisting anyone else in defeating such a system (for example, by giving someone a password to a system that he's not supposed to have), and by "harmful access," whereby someone causes a computer to malfunction or "alters, damages or destroys data of a computer program."

Penalties range from a term of up to 180 days in the county jail and/or a $1,000 fine to a prison term of from two to 10 years and/or a fine of up to $5,000.

Much of the local discussion by BBS SysOps around here has centered on the question of whether this new law could be applied to someone who breaks into a privately-run BBS, and the layman's consensus is that there does not appear to be anything in the code that limits prosecutions to the gigantic corporations or commercial data processing establishments. Let's hope we don't have to find out.

Self-Policing of BBSs in Saskatchewan

BBS owners and operators in the Regina, Saskatchewan area of Canada have banded together in an association of SysOps to help keep their area's systems as well run and legitimate as possible. Robert Hamilton, the SysOp of the Phoenix BBS, a CoCo board, reports that the association has had great success, using peer pressure.

If you're in the area, or would like more information on how your area could start a SysOp's Association, contact:

Robert Hamilton
SA SysOp
P.O. Box 401
Regina, SA

New Videotext Services

As the popularity of online communications services has grown over the past few years, there has been an upsurge in local and regional videotext services, as well as nationally advertised speciality networks.

The attorneys of the world have WESTLAW, the Biomedical Community has BMEDSS (Biomedical Engineering Decision Support Services), the physicians have the AMANet, and now, those looking for contacts with "that special someone" have not one, but two online systems devoted to helping you meet that special person.

"You will be meeting someone new. Someone you've never met, yet already know. This is not a futuristic fantasy. It's INTERLUDE . . . "according to an ad from INTERLUDE, a Grand Prairie, Texas, company.

For the introductory price of $75, INTERLUDE provides you with a terminal and a hookup to your television set, along with a local access number to dial to connect into their network.

CVC ONLINE, a New York City

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outside of US add $3.00 for shipping

NAME ____________________
ADDRESS____________________
____
PHONE____________ZIP________

information service, has an initial fee of $12.95, and provides an electronic matching service usable with any terminal program . . . "all you need is a personal computer to join in the fun."

Both services are limiting their clientele to adults only, by the way.

For more information on INTERLUDE, you can call (214) 660-2874. For more information on CVC ONLINE, you can contact them at (212) 972-4719 or write: 801 Second Ave., New York, NY 10017.

CCSig Milestone

On one of the more conventional information services, The Color SIG reached a major milestone this summer when the system processed the 100,000th message on CCSig.

In just a little bit over three years online, CCSig has proven to be the longest-running online CoCo information service, processing an average of 90 messages a day over those three years.

So, for all those present and past who have made the CCSig what it is today, a hearty "Thanks!", and hope that the next 100,000 is just as fun!

Mikeyterm Update

There is now a total of three versions of *Mikeyterm* that have been issued by Mike Ward, *Mikey*'s creator.

Version 2.3 is the entry-level version, supporting 300 Baud through the normal RS-232 port on the CoCo, and using 32 by 16 video (normal CoCo text screen).

Version 2.5 requires the use of an RS-232 ROM pack or PBJ-2SP Serial card to provide either 300 or 1200 Baud service using the normal text screen.

Version 3.5, the latest version to be released, also requires the RS-232 ROM pack or PBJ-2SP Serial card, and will support both the normal text screen or the 80-column screen of the PBJ *Word-Pak* (either *Word-Pak I* or *II*) if one is installed. It also supports 300 or 1200 Baud.

A note to users of Version 2.5 or 3.5, as well as other terminal program users that are using the RS-232 ROM pack, you may find that your system appears to be "locked up" unless you provide the RS-232 pack with an apparent "Carrier Detect."

In the case of a Radio Shack Modem II, there is a switch on the back of the modem that allows the carrier to be held high at all times, enabling the sending of auto-dialing instructions, which do work with a CoCo (regardless of what another CoCo magazine reported this spring).

The Hayes Smartmodem provides for a carrier signal to be sent to the modem at all times through the use of a programming switch on the front of the circuit board.

If you're having trouble with any of the terminal programs that use the RS-232 ROM pack, check your modem instructions to see whether you can fool the system into believing there is always a carrier present.

We had planned on including a comparison chart of the various BBS systems available to CoCo owners this month, but circumstances prevent us from living up to that promise at this time. In an effort to be fair to all concerned, the comparison chart is now planned to be included in January's "CommLink."

I hope we had a chance to meet each of you at the RAINBOWfest in Princeton, N.J., in October. It's always enjoyable to get together with RAINBOW readers and swap interesting BBS numbers. If you didn't get a chance to be there, hopefully we'll catch you at the next show!

As always, you can read me several different ways — through the editorial offices of THE RAINBOW, on CompuServe's CCSig (GO COCO) (User ID: 76703,376), through TBBS Fort Worth (817) 232-2087 (300/1200/2400 Baud) or at P.O. Box 79074, Fort Worth, TX 76179. If you write, and would like a direct reply, please be sure to enclose a self-addressed, stamped envelope. ☐

Color Computer / FLEX / OS9 BBS LIST
Updated 9/1/85
***=300/1200 Baud +=300/1200/2400 Baud**

A/C	Number	City	BBS Name	Remarks
(201)	526-6839	Middlesex, NJ	The Airport	
(201)	564-6112	Short Hills, NJ	CoCo Nuts	
(201)	572-0617	New Bruswick, NJ	Colorama	
(201)	657-0611	Lakehurst, NJ	Color Corner	
(201)	725-5028	Manville, NJ	C.C.I.E. #1	HQ SYS
(201)	773-8265	*Wallington, NJ	Meadowlands BBS	
(201)	827-7815	Ogdenburg, NJ	Sussex Co BBS	
(201)	928-0949	*Jackson, NJ	Coco Creations	
(203)	229-6481	*Kensington, CT	Cool Coco OS-9	
(203)	334-5778	Bridgeport, CT	Mission Control	
(205)	649-2894	Mobile, AL	unknown	
(206)	255-5150	Renton, WA	The Light House	
(206)	256-2321	Vancouver, WA	Northwest Color Conn	
(206)	425-2576	Longview, WA	KWCBBS	
(207)	596-0556	Rockland, ME	Maine-Frame	Note 9
(209)	223-3800	Jackson, CA	Gold Country	
(212)	682-0681	New York City, NY	Grand Central Terminal	
(213)	244-1100	Burbank, CA	Fantasy Plaza	
(213)	258-0640	Los Angeles, CA	Musashi-Color 80	
(213)	690-4589	Los Angeles, CA	The Next Step	Note 3
(213)	773-3024	Los Angeles, CA	COBBS #8	

(214)	579-1840	Irving, TX	Irving BBS	
(214)	686-4796	Dallas, TX	The Flying Fortress	0700-2200
(214)	784-7883	Irving, TX	NE Texas BBS	1700-0900
(215)	768-0699	Devon, PA	COBBS	
(215)	866-1805	Bethlehem, PA	Colorama	
(216)	788-7910	Youngstown, OH	Coco Nut Tree	
(217)	359-9577	Urbana, IL	CCSH BBS #1	HQ SYS
(217)	753-3167	Springfield, IL	Link up	
(219)	234-9717	Mishawaka, IN	SAGCOM Coco Line	
(301)	736-9425	Forestville, MD	Colorama	
(303)	297-9127	Denver, CO	Trash Heap TBBS	
(303)	634-8342	Colorado Springs, CO	COBBS	
(303)	690-9423	Aurora, CO	Controller Board	
(304)	599-0760	Morgantown, WV	Mountaineer	
(305)	274-3394	Miami, FL	RemoteOS9	
(305)	281-0325	Orlando, FL	Intelliboard+	
(305)	681-8490	Hialeah, FL	Coco Corner #2	
(305)	731-6097	Ft Lauderdale, FL	Comtech	HQ SYS
(305)	751-6809	Miami, FL	Color Info Center	
(306)	789-7883	Regina, Saskatchewan	Phoenix BBS	
(308)	665-1526	Crawford, NE	Colorama	Note 9
(312)	278-9513	Chicago, IL	Howard Med Sys	
(312)	397-8308	Chicago, IL	OS-9 Users Gp	Note 1
(312)	597-8485	Chicago, IL	Creme de Coco	
(312)	720-0796	Chicago, IL	Coco Extraordinarie	
(312)	879-6811	Batavia, IL	Speech Systems	
(313)	981-5061	Canton, MI	Coco Club	
(314)	428-2692	*St. Louis, MO	As Is Software	
(315)	487-0503	Syracuse, NY	Color-80	
(315)	986-4828	Rochester, NY	Color-80 #12	
(316)	686-3813	Wichita, KS	Color-80	
(317)	873-5808	Indianapolis, IN	CoCo Hotline	
(319)	277-0646	Cedar Falls, IA	Computer Cellar	
(319)	396-8875	Cedar Rapids, IA	Bloom County Herald	
(401)	272-1138	Providence, RI	Syslink-80	
(401)	765-2890	Woonsocket, RI	Colorama	
(403)	474-0147	Edmonton, Alberta	Nothern Alberta Coco	
(403)	564-4118	Blairmore, Alberta	Wes-Can BBS	
(404)	378-4410	Atlanta, GA	Coco Board HQ	HQTRS SYS
(404)	924-1248	*Acworth, GA	CocoServe	
(405)	728-7654	Oklahoma City, OK	Coco, Inc	OLD FLEXNET
(405)	248-8433	Lawton, OK	Shambala	
(408)	629-2277	San Jose, CA	Microbur BBS	
(408)	646-1850	Monterey, CA	Pen-Co BBS	Note 10
(409)	983-2383	Port Arthur, TX	Coco Club BBS	
(412)	744-2335	Pittsburgh, PA	Coconet	
(413)	532-9631	Chicopee, MA	Coco Nut	
(414)	699-3214	Watertown, WI	Color-80	
(414)	793-4055	Two Rivers, WI	Midwest Data Xchange	
(415)	364-2658	Redwood City, CA	Redwood Color Board	
(415)	782-4402	Berkley, CA	East Bay BBS	
(416)	494-7001	Toronto, Ontario	Colour BBS	
(416)	653-2248	Toronto, Ontario	Colour Dragon #1	
(416)	689-7950	Toronto, Ontario	Dave's Datacom	
(416)	743-6221	Toronto, Ontario	CoCo Nut	
(416)	823-4521	Toronto, Ontario	Colour Dragon #2	
(501)	735-5614	*West Memphis, AR	CoBBS #1	HQ SYSTEM
(502)	365-7785	Princeton, KY	Colorama	
(502)	937-4594	Louisville, KY	Colorama	
(503)	649-4497	Aloha, OR	Bee Color BBS	
(503)	761-6345	Portland, OR	Bit Bucket Sys	
(504)	277-6926	Chalmette, LA	Chalmette BBS	OS-9 SIG
(504)	876-1790	Houma, LA	Bayou Board	

(504)	885-5619	New Orleans, LA	Starbase 6809	
(512)	285-5028	*Elgin, TX	Colorama	HQTRS SYS
(512)	353-1508	San Marcos, TX	Colorama	Note 9
(512)	674-0264	*San Antonio, TX	SA Color Board	
(513)	236-8307	Dayton, OH	DACCUG	
(513)	396-7467	Cincinnati, OH	CINSOFT	
(513)	399-1262	Springfield, OH	Colorama	
(513)	474-2985	Cincinnati, OH	CINTUG	
(514)	658-3087	Chambly, Quebec	Color-80 #7	Note 9
(515)	277-6510	Des Moines, IA	Coco Club	
(516)	277-1285	Islip, NY	Colorama	
(516)	331-3718	Port Jefferson Sta, NY	Colorama	Note 9
(516)	673-9452	Long Island, NY	unknown	
(517)	339-3367	Lansing, MI	CoompuNet TBBS # 1	
(517)	793-1579	Saginaw, MI	C/Net	
(602)	245-0488	Phoenix, AZ	Coco Net	
(602)	298-0730	Tucson, AZ	Super CoCo BBS	
(602)	344-8070	+Yuma, AZ	TBBS Cactus Patch	
(602)	899-1350	Chandler, AZ	Coco Pub	JDOS
(602)	996-8828	Scottsdale, AZ	Motorola Coco Bugs	
(604)	585-0680	Delta, British Columbia	Color-80	
(604)	738-2773	Vancouver, BC	Color Pacific	
(609)	399-7108	Ocean City, NJ	Colorama	
(609)	448-1361	Lawrenceville, NJ	The Tardis	
(609)	448-7768	+East Windsor, NJ	Coco Enterprise	
(612)	434-9186	unknown	The Outhouse	1500-0800 M-F
(614)	754-1971	unknown	Colorama	1100-1300
(615)	581-9752	Morristown, TN	CoCo Power	
(615)	839-3130	Monterrey, TN	Colorama	
(615)	842-6809	Hixson, TN	68 Micro Journ	FLEX
(616)	345-0536	unknown	Sunburst	
(617)	472-8612	Quincy, MA	Photo Talk	
(617)	646-6809	Arlington, MA	Logical Products	
(617)	872-5170	Framingham, MA	Framingham Connection	
(617)	879-4086	Framingham, MA	Gator Bowl	
(619)	368-3478	unknown	Inner Connection	
(619)	437-1130	Coronado, CA	The Monitor	
(701)	281-0233	Riverside, ND	Dakota Database	
(701)	839-0390	Minot, ND	Country Micro BBS	Note 6
(703)	476-1147	Reston, VA	Samoht BBS	Note 5
(703)	631-8577	unknown	Shadow*Keep	
(703)	680-3075	*Dale City, VA	Colorama	
(704)	541-3306	*Matthews, NC	S.A.O.C.N.C.	
(707)	437-6336	Travis AFB, CA	Falcon Color 80	
(713)	331-2599	Houston, TX	Freelancin'	
(713)	354-3717	Houston, TX	COBBS	
(713)	426-7070	Highlands, TX	Color-80 #51	Note 9
(713)	488-2003	Houston, TX	Freelancin'#2	
(713)	923-6809	Houston, TX	Coco Loco	
(713)	941-1542	Houston, TX	Golden Coco	
(714)	350-2668	Fontana, CA	Color Corner	
(714)	534-5174	*Huntington Beach, CA	Orange Co Color Amer	
(716)	473-2334	Rochester, NY	Colorama	
(717)	652-8659	Harrisburg, PA	Colorama	
(718)	727-1781	New York City, NY	Tele-Net	1800-0700
(718)	499-1633	Brooklyn, NY	The Call Board	
(803)	279-5392	Augusta, SC	Augusta Forum TBBS	
(803)	288-0613	Greenville, SC	DLOAD OS-9 BBS	Note 7
(803)	669-3275	*Florence, SC	Pro-Color Board	
(803)	791-7389	Columbia, SC	Midlands 80 Comp Club	
(804)	862-4663	Petersburg, VA	Three Musketeers	
(804)	868-0922	Tidewater area, VA	Peninsula Color Board	
(804)	887-5302	Williamsburg, VA	Gamma Color 80	

(805)	484-5491	Camarillo, CA	Colorama	
(805)	656-3746	Ventura, CA	Ventura BBS	
(805)	687-9400	*Santa Barbara,CA	Coco Corner #1	HQ SYS
(812)	476-9453	Evansville, IN	Evansville Connection	Note 8
(813)	345-8100	unknown, FL	6809 CIS	
(813)	677-9530	Riverview, FL	MicroWorld	
(813)	733-2415	unknown, FL	Dunedin TBBS	
(813)	879-1105	Tampa, FL	The Coco BBS	
(813)	924-COCO	Sarasota, FL	Color-80 #41	
(815)	458-6628	Will County, IL	Colorama	
(816)	232-4932	St. Joseph, MO	Dragon's Lair	
(816)	436-2904	Kansas City, MO	Frisky CoCo	
(817)	232-2087	+Fort Worth, TX	TBBS Fort Worth	
(817)	641-0133	Cleburne, TX	Dragonfire BBS	Note 9
(817)	767-5847	Wichita Falls, TX	Commnet-80	
(818)	335-6554	Arcadia, CA	Color America BBS	
(818)	787-0433	Panorama City, CA	Official Comp Fedrtn	
(818)	886-6041	Northridge, CA	Plain Rap	
(818)	996-1977	Reseda, CA	TRS-80 Country	OS-9
(902)	434-5278	Halifax, Nova Scotia	Colorama	2100-0800
(902)	683-2086	Port Mouton, Nova Scotia	Colorama	
(902)	857-9843	Hubbards, Nova Scotia	Colorama	
(913)	384-2196	Kansas City, KS	Online Beta Sigma Pi	
(912)	232-4582	Goldens Bridge, NY	Undersea Kingdom	
(914)	362-1422	Pomona, NY	Telemation OS9	
(914)	738-6857	Pelham, NY	M & M's Public BBS	
(914)	961-8049	Westchester, NY	Westchester BBS #2	
(914)	965-2355	Westchester, NY	Westchester BBS	
(914)	965-7600	Yonkers, NY	Colorama	
(916)	381-8788	Sacramento, CA	Sacramento CCC	
(916)	753-4066	Davis, CA	Univ of CoCo	
(919)	425-7139	Fayetteville, NC	Color-80 #82	
(919)	758-5261	Greenville, NC	SangarNet	

Notes:

1 OS9 Users Group. Type `CR/LF` until it responds "Please Log In."
Then type `HELLO-G500,,3` and ENTER
2 Hours: 2000-1630 Mon-Fri, 2000-1000 Weekend/Holidays
3 Pro Color File Users Group
4 2200-0800
5 Sat-Sun 0600-1000, Mon-Fri 1800-1900
6 Mon-Fri 2000-0800, Sun 1800-Mon 0800
7 Mon-Sun 2200-0700
8 Weekends *only*
9 Evenings and Weekends (generally after 1700 on weekdays)
10 Mon-Fri 1800-2000, Sat 2200-0700, Sun 1400-1600

HQ SYS: These BBS systems are available either commercially or by arrangements made with the SysOp. Check the BBS for further details on how you can obtain this BBS software.

One-Liner Contest Winner . . .

This one-liner uses `PEEK`s, `POKE`s and a `USR` call to display alphanumeric characters and some special symbols on the Hi-Res screen. Try all the keys on the keyboard, with and without SHIFT, to see the results. (If you have a replacement keyboard with four function keys, try F4 as well.)

The listing:

```
10 A=PEEK(27)*256+PEEK(28)-822:B
=A+10:POKEA+22,PEEK(188):DEFUSR9
=B:PMODE2,1:PCLS:SCREEN1,1:A$=US
R9(INKEY$):GOTO10
```

Scott Roberts
Coventry, RI

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

Quick File

Managing Information
Storage And Retrieval

OWL-WARE announces MISAR QUICK FILE

the Fastest, Easiest to Learn Data Base System Available for the Color Computer!!!

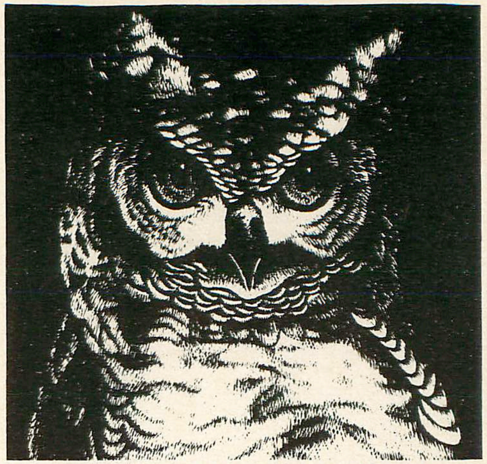
YOU CAN EASILY CREATE A FILE OF ANYTHING YOU WISH TO KEEP TRACK OF OR ORGANIZE. THE ONLY COCO DATA BASE WHICH ALLOWS RECORDS IN THE SAME DATA FILE TO HAVE DIFFERENT FORMATS. YOU MAY PUT ADDRESS FILES, APPOINTMENT FILES, MEMOS, COLLECTIONS, ETC. IN ONE FILE! EACH OF THESE MAY BE ORGANIZED WITH A DIFFERENT FORMAT. A COMPREHENSIVE MANUAL IS INCLUDED BUT THE DEMO FILE AND PROGRAM MENUS ARE SO CLEAR YOU CAN ALMOST DO WITHOUT IT.

YOU DONT NEED TO KNOW ANYTHING ABOUT DATA BASES TO QUICKLY AND EFFECTIVELY USE MISAR. This is a very easy to use, very compact and very fast filing system.

Example Using 300 Address Memos

	MISAR	"BEST KNOWN COCO DATA BASE"
SORT:	2 1/4 min	210 min.
DISK FILE SIZE:	10 gran.	32 gran.

!ntro Price Until Nov. 15
$39.95
REGULAR PRICE $44.95
(Great Value)



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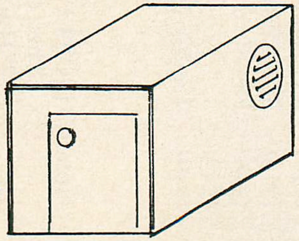

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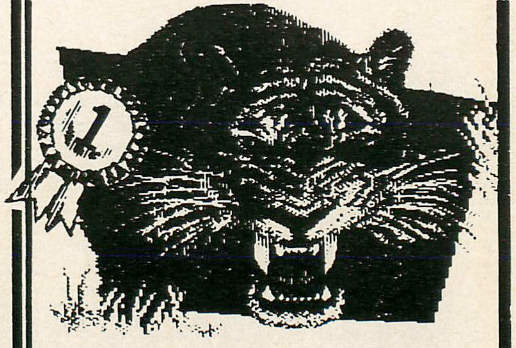

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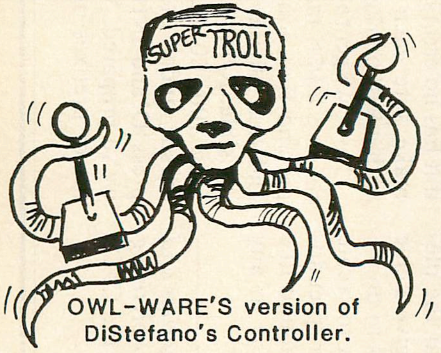

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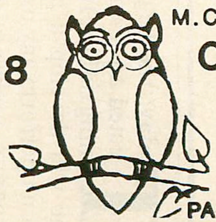

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A Diversion A Day Keeps Programming Fey

By Joseph Kolar
Rainbow Contributing Editor

Today, the beginner will be subjected to a variety of programming tidbits. In the process, he or she will develop a program though it won't perform any useful function. Any program, useless or not, may be used as a vehicle for sharpening programming skills. It should be interesting and fun, and when finished, you should marvel at your classy accomplishment.

Here is the rationale for the current project: Consider some of the words that evolve into our language with abbreviations, contractions and acronyms — better known as jargon. Our computer hobby is overwhelmed with "jargonese." The beginner can become confused when reading, for instance, a computer ad, and blanches at the plethora of jargon that doesn't give a clue as to what the product claims to do.

Why not devise a program to create artificially produced words, or "pseudowords," ones that look and sound like actual words? These won't be in any dictionary!

(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)

Let's use Latin as our source. Three categories will be required: prefixes, roots and suffixes. We will combine them to originate one to three syllable words. Since the raw material of our project is real components of Latin-derived words, some real words will be generated. Amongst the dross of lackluster real words, we will invent some plausible nonsense words.

Every program line in Listing 1 has a `REM` marker in front of it. Since it is always more instructive to create a program and watch it take on substance, you should key it in and worry about correcting typing errors as we unveil the lines. On running, you should get nothing on the screen except "OK" if it has no errors. `LIST` it and check to make sure each program line begins with a `REM` marker.

Now, we get to work! Every time you remove a `REM` marker (′) from a line, pretend that you have just typed it in and that all the `REM` marker lines are invisible. Remove the `REM` marker from Line 100, `EDIT100` and position the cursor under the `REM` marker. Next, press 'D' and ENTER. This is the first line we've prepared. We are going to put a list of prefixes into a `DATA` statement. There are 20 common prefixes in this array.

Unmask Line 101. We gleaned 50 Latin roots. For the purists, we usurped a bit of literary license with NOMIN reduced to NOM and LIBER shortened to LIB.

Uncover Line 102. We managed to scrounge up 33 suffixes. Now our raw material has been assembled.

We will store these word elements in three arrays.

CoCo automatically allocates 11 slots, from zero to 10. In order to reserve more space, we must tell CoCo in a `DIM` statement what our requirements are.

Uncover Line 10. The array, A$, contains the 20 prefixes, B$ contains the 50 Latin roots and C$ houses the 33 suffixes.

We began constructing our program at Line 100. Why not Line 10? Lots of empty lines are left to add to and work around program lines that we create as we progress. Remember, you can't always know where or how your idea will develop. It is important that you do not renumber or disturb your program lines. Your data is in lines 100-102 and will remain there until the program is completed. If you keep relocating the program lines, you tend to lose track of them. Rather than mentally recalling the line number, you must seek it out by scrolling through the listing.

Now that we have reserved array space, we must put our data into the proper files. Unmask Line 200. Using a `FOR/NEXT` loop, we take every item in Line 100, calling each prefix, 'A', and enter it in an assigned location in the prefix A$ array. Thus A$(1) contains AB, A$(2) contains RE, A$(3) holds EX, etc. Each prefix has a specially defined home.

Uncover Line 201: here we place the 50 roots, 'B'.

Unmask Line 202. The suffixes, 'C', are assigned a home. All the word particles are now in CoCo's memory in arrays when the program in `RUN`. Press `BREAK` and take a few samplings, for example, type `PRINT A$(1);B$(50);C$(2)` — you should get ABMOVATE. The three word elements have produced a nonsense word!

We must tell CoCo we want random particles and allow it to select them. Uncover Line 250. The 20 prefixes designated with the variable 'A', the 50 roots assigned as 'B' and the 33 suffixes called by 'C' are placed in three `RND` statements, one for each group.

We must figure out where to locate our randomly selected word particles. Uncover Line 300. Using `PRINTTAB`, we decide to start our column of words 10 spaces from the left margin. We will print, starting at that location, a randomly selected prefix. We end the statement with a semicolon (;) because we want the root tacked at the end of the prefix.

Unmask lines 301 and 303. In Line 301 we determine which root is used and in Line 303 we choose the suffix. When we `RUN`, we get a three-syllable word.

Run the program a few times. It is a pain to generate just one psuedo-word. Line 303 directs CoCo to go to Line 315. We plan to make 10-word lists to study the words we create.

Unmask Line 315. We set up a counting system to keep track of each time a word is printed (E=E+1), and until 10 words have been printed, to go back to Line 250 and keep knocking out words. When the tenth word (E=10) is created, CoCo is sent to Line 316.

Unveil Line 316. We print a pair of blank lines. Uncover Line 317. This command holds the panting CoCo from spewing out more words until you are finished looking at the list. This is done by pressing any key. Since we want to create another list of 10 words, we reset the counter to zero (E=0).

Uncover lines 1 and 319. We clear the screen to black in both cases. Then, in Line 319, we loop back to Line 250 to generate a new sampling of psuedo-words. `RUN` and keep tapping any key to check out what you have wrought.

This produces a nice variety of words, but they are all three-syllable words. Quite boring! Why not make some with two syllables, the prefix and the root? While we are at it, why not make a sampling of two-syllable words containing the root and suffix?

> ***"The beginner can become confused when reading, for instance, a computer ad, and blanches at the plethora of jargon that doesn't give a clue as to what the product claims to do."***

To set up this system, unmask Line 260. The variable 'D' asks for three random alternatives. If D=1, we set up a three-element word. If D=2, we go to another location to create a word consisting of only the prefix and root. If D=3, we go to a third location to create a word consisting of a root and suffix.

Uncover lines 305, 306 and 308. Line 305 prints the prefix, Line 306 prints the root and Line 308 sends CoCo on its way to count the word. Uncover lines 310 and 314. These two lines print the root and suffix words and move on to tally the number of words.

Now that we have a working program, unmask lines 6-9. Substitute your name and address in the appropriate places and adjust the `PRINTTAB` locations to center the title. You will be given credit for the program for a brief moment, then the first set of words is created. Line 316, already unveiled, pushes the title up and out of the display. Put the `REM` marker temporarily back in Line 316 to verify this.

Now that we have personalized the listing, uncover Line 5 and `RUN`. Note how neatly the text lines are placed on the display. It looks downright professional. Press `BREAK` and `LIST`. The lines will be scrolled on slowly and allow you to look at the program lines.

If you must modify, improve or change the program, you can `POKE 359,126` to get back to the normal listing. This will eliminate the smooth text placement, but you can't have everything. This completes the listing.

All sorts of work is required to polish this program. It needs to be individualized so it is truly your own work. Note that no real title card is created — no instructions, no ending, no nothing.

Here is the rule. First, create a viable core program. Then and only then, in the following order, insert sound and graphics embellishments, if any. Next create the end panel, the instructions and the front title card, in that order. (Adding sound slows down the execution of a program and is a bother to listen to as you make repeated trial runs.)

Listing 2 is a collection of three program lines you may want to key into your finished program. They were pulled out of the original listing because the `RIGHT$` function will be covered and explained in an upcoming article. These lines will add a bit more pizazz to the phony word list.

Line 302 determines in a three-syllable word if a root ends in 'T', then C$(1) (TION) becomes ION, eliminating the double TT. For instance, REJECTTION becomes REJECTION. If the root word does not end in 'T', then TION becomes SION.

Line 307 determines in a prefix-root word if the root ends in 'T', then 'S' is added. If not, an 'E' is added.

Line 311 determines in a root-suffix word if the root ends in 'T' then TION becomes SION. If not, TION becomes ION.

You may not like some of these lines, so don't use them. You many want to experiment where the root ends in SS and is followed by TION, expand your word lists or use Greek word elements. See what a neat batch of psuedo-words you can concoct.

Let me leave you with the thought that no matter how foolish an idea may be, it is easy to get caught up in developing it into a fun program. If you enjoyed working on this diversion, you are on your way to programmer's heaven.

☐

102 241
END 245

Listing 1: BASTRAN1

```
0 '<LISTING1>
1 'CLS0
5 'POKE359,60
6 'PRINT:PRINT:PRINTTAB(10)"JOSE
PH KOLAR"
7 'PRINTTAB(6)"1709 DICKINSON ST
REET"
8 'PRINTTAB(8)"INVERNESS, FLORID
A":PRINT
9 'PRINT:PRINT:FOR Z=1TO500:NEXT
10 'DIM A$(20),B$(50),C$(33)
100 'DATA AB,RE,EX,PRO,CON,DE,IN
,SUB,PER,PRE,AD,CIRCUM,DIS,INTER
,OB,TRANS,ANTI,ANTE,AN,UN
101 'DATA DUCT,FER,JECT,SCRIP,PO
N,MIT,PORT,CEPT,VECT,CUR,CAP,CIP
,CED,CUP,DICT,FACT,FEC,FIC,GRAT,
LOC,MEND,MENT,MULT,NOV,PELL,PED,
PRESS,PUG,SERV,SPECT,SPEC,SPIC,S
TRUCT,STRUD,VEN,VENT,VICT,VIN,TU
RN,PLEX,GRESS,PULS,LUC,OMN,DOC,M
ORT,NAV,NOM,LIB,MOV
102 'DATA TION,ATE,ENT,ANCE,OUS,
ABLE,AL,ER,IFY,ENCE,ITY,TUDE,OR,
IAC,ACIOUS,ACY,AGE,ANCY,ARY,ITIO
US,IVITY,ERY,ESCENT,FEROUS,IC,IN
E,ISM,IST,IVE,ORY,ULENT,ISE,IZE
200 'FOR A=1 TO 20:READ A$(A):NE
XT
201 'FOR B=1 TO50:READ B$(B):NEX
T
202 'FOR C=1 TO 33:READ C$(C):NE
XT
250 'A=RND(20):B=RND(50):C=RND(3
3)
260 'D=RND(3):ON D GOTO300,305,3
10
300 'PRINTTAB(10)A$(RND(A));
301 'PRINTB$(RND(B));
303 'PRINTC$(RND(C)):GOTO315
305 'PRINTTAB(10)A$(RND(A));
306 'PRINTB$(RND(B))
308 'GOTO315
310 'PRINTTAB(10)B$(RND(B));
314 'PRINTC$(RND(C))
315 'E=E+1:IF E=10 THEN GOTO316
ELSE250
316 'PRINT:PRINT
317 'EXEC44539:E=0
319 'CLS0:PRINT:PRINT:GOTO250
```

Listing 2: BASTRAN2

```
0 'LISTING2  ADDITIONAL LINES FO
R LISTING1
302 IF RIGHT$(B$(B),1)="T" THEN
C$(1)="ION" ELSE C$(1)="SION"
307 IF RIGHT$(B$(B),1)="T" THEN
C$(C)="S"ELSE C$(C)="E":GOTO315
311 IF RIGHT$(B$(B),1)="T" THEN
C$(1)="SION" ELSE C$(1)="ION"
```

Listing 3: BASTRAN3

```
0 '<POKE178>
5 CLEAR500
10 PMODE4,1:PCLS2:SCREEN1,1
20 O$="NR10U20R10D20BR6"'O
21 R$="U20R10D10L10F10BR6"'R
22 J$="R10NU20BR6"'J
23 E$="U10NR8U10R10BD20NL10BR6"
24 K$="U10NU10NE10F10BR6"
25 L$="NU20R10BR6"
26 A$="U20R10D10NL10D10BR6"
27 T$="BR5U20NL5R5BD20BR6"
28 I$="NU20BR6"
29 H$="U10NU10R12NU10D10BR6"
30 W$="NU20R6NU16R6NU20BR6"
31 N$="U15NU5F10NU15D5BR6"
32 B$="U20R8D10NL8R2D10NL10BR6"
40 FOR X=RND(8) TO RND(26)
41 TT$=T$+"BR4"+H$+"BR4"+E$
42 UU$=R$+A$+I$+N$
43 VV$=B$+O$+W$
50 POKE178,X
51 DRAW"S4BM102,65"+TT$
52 DRAW"S8BM27,135"+UU$:DRAWVV$
53 DRAW"S4BM103,66"+TT$
54 DRAW"S8BM28,136"+UU$:DRAWVV$
55 DRAW"S4BM104,67"+TT$
56 DRAW"S8BM29,137"+UU$:DRAWVV$
57 DRAW"S4BM105,67"+TT$
58 DRAW"S8BM30,137"+UU$:DRAWVV$
59 NEXT:GOTO40
```

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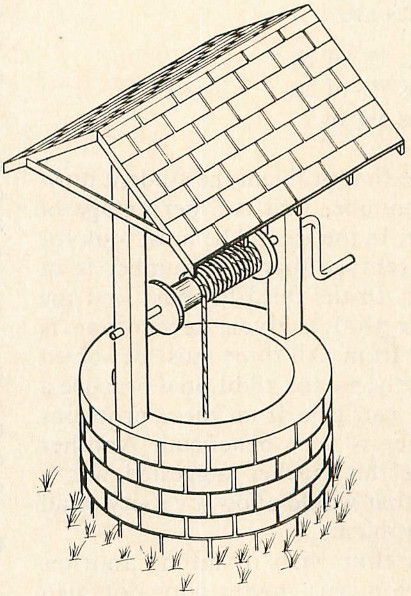

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget that this is* BASIC. *All programs resulting from your wishes are for your use but remain the property of the author.*

Welcome back to the "Wishing Well" as we work our way toward the holiday season. I hope everyone enjoyed last month's *CoCo Puzzle Maker*. This month, we get back into the field of education with a program designed to meet some of your more frequent requests.

I was very surprised by the response I received on *Super Math Worksheet Generator* (August 1984, Page 38). That program, for those who may not have seen it, was designed to help teachers or parents create endless varieties of addition, subtraction, multiplication and division worksheets. I have strongly suggested in these pages many times that Computer Aided Instruction (CAI) can also be achieved by letting the computer create and print out the normal tools of teaching: written materials.

(Fred Scerbo is a special needs instructor for the North Adams Public Schools. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)

One of the nice things about *Super Math Worksheet Generator* is that it not only created these sheets, each one completely random, but also that it created a matching answer sheet to check the completed problems. After all, why spend time correcting the problems by hand or calculator when the same CPU that thought up the problems can calculate the answers just as easily.

I naturally expected teachers to find this program helpful. I used it myself almost every day in school. What really came as a surprise is the number of parents who wrote and said their kids loved drilling their math skills with papers created by the family CoCo. In the midst of all the "thank yous" was another wish: give us more like this.

It has taken a little over a year to come up with another program that is different from the original, yet valuable to an important math-related skill. The result is *Super Mathsheet Generator II*, a relative of the original but a program that helps with two of the more difficult math skills: calculation of percentages and reduction/expansion of fractions.

The Wish

Many times I am asked to put on workshops for other educators in surrounding school systems. Many of them do not have CoCos, so I have to rewrite or translate my CoCo educational programs to their machines (usually Apples or Commodores).

Many teachers liked this program so much they asked me to create an Apple and Commodore version. Since neither one of these machines have a `PRINT USING` command, it is difficult to create a program like this one and have it line up the numbers of each problem. The task is not impossible, just difficult and memory-consuming.

In the process of translating the original program, one of the teachers suggested I come up with a math sheet generator that could deal with percentage problems. What she was looking for

Special thanks to John Robertson of Olney, Ill., for creating our "Wishing Well" logo.

was some way to express on paper the three different kinds of percentage problems students must work with. The examples are:

1) ? is 5% of 20
2) 5 is ?% of 20
3) 5 is 5% of ?

In the first problem the student must find a number that is a percentage of another. In the second he must look for the percentage that one number is of another. In the third he must find the number that a given percentage is derived from. All three must be solved differently, so any additional practice a student can gain from these problems on paper is very beneficial. Another variable this teacher suggested was a choice that would allow a variety of all three problems.

With that wish in mind, another suggestion was made: why not also create a program that generates fraction problems? For example:

¾ = ?/8

Teachers must create worksheets like this at random for students to practice on. Having the computer develop random sheets saves a great deal of time.

To develop these programs for a Commodore 64, I had to work without the benefit of `PRINT USING`. When faced with such a problem, I usually write the original program on my CoCo by incorporating all the limitations of the machine I will be translating it to. Therefore, I wrote algorithms for two programs that solve these tasks. One is named *Percents* and the other is named *Fraction*. Translating these back to Commodore BASIC is relatively easy after creating the CoCo version.

Needless to say, these teachers were very pleased with their new programs. *Percents* created the four types of sheets mentioned, and *Fraction* created sheets with the fraction format described. The only limitation to both is that neither one is designed to create a coded answer sheet the way the original *Super Math Worksheet Generator* does. Since both types of math sheets are not that difficult to correct and the teachers did not ask for the answer sheet option, I hadn't written them into the programs.

Therefore, when the time came to offer these programs for my readers, I decided to combine the two into one so as to create *Super Mathsheet Generator II*. I also realized this would be a good time to incorporate an answer sheet option. The finished program is what you now have.

Using the Program

When typing in this listing, keep in mind that any part of the listing appearing in lowercase letters must be typed in by pressing SHIFT 0 to get the characters, then SHIFT 0 to return to uppercase. Only a few lines require this, which should be familiar to some of you by now. You will notice the screen format looks very much like the original program, so the two programs can be used side by side.

On running the program, you will be presented with five choices. Choices 1 through 3 are the three *percent* formats. Choice 4 is the assorted/combination percentage option. Choice 5 is the *fraction* sheets. If 1 through 4 is chosen, you are asked to select the maximum number range for the problems. The number selected is the largest possible digit that appears as the left-hand digit (?) in the format:

? is 10% of 100

The program prints the sheets in enlarged print and leaves enough work space for students to do some figuring. (If your printer does not use `CHR$(31)` for enlarged print, change it to the control character that gives that result.) The sheet identification number is also printed to match up with the corresponding answer sheet. When the sheet is finished, advance your next sheet of paper to get ready for the answer sheet and press ENTER to print it. The program gives prompts as you need them.

If Option 5 for *Fractions* is chosen, you are also asked to select a maximum number that will be the largest digit appearing in the numerator of the fraction on the left. Printing answer sheets is handled the same as with Option 1 through 4. Only the program lines that accomplish this are different. The program also returns to the menu whenever the problem sheets and answer sheets are finished printing.

You may wish to experiment with the maximum numbers to give the type of problem you want. Remember, each sheet will be different, but if you choose a small number to enter, say, a single digit like '3' or '4', many of the problems may end up looking the same. You be the judge of how you want the sheets to look. Remember, too, as the student advances, the difficulty of the problems may be increased. In other words, the program can grow with your child's advancement.

Conclusion

I hope you find *Super Mathsheet Generator II* useful, whether it be for home or school. If anyone has ideas for other types of math sheets I have not yet created a generator for, please drop me a line with your suggestions.

Next month: A special Christmas gift from the "Wishing Well." ☐

```
150 ......131
270 ......249
440 ......180
620 ......180
780 ......173
END .....210
```

The listing: MATHGEN2

```
10 REM****************************
20 REM*  PERCENT & FRACTIONS    *
30 REM*  WORKSHEET GENERATOR    *
40 REM*    (SUPER MATHGEN2)     *
50 REM*    BY FRED B. SCERBO    *
60 REM*  COPYRIGHT  (C) 1985    *
70 REM*     60 HARDING AVE.     *
80 REM* NORTH ADAMS, MA 01247 *
90 REM**************************
100 CLEAR400:DIM N(5),A$(10,3),L
(10,4)
110 CLS0:LC$=CHR$(175)+CHR$(170)
:RC$=CHR$(165)+CHR$(175):EB$=CHR
$(175)+CHR$(175):GOSUB120:GOTO14
0
120 CLS4:PRINTSTRING$(32,172);:P
OKE1056,32:PRINT@33,"percent";:P
OKE1064,32:PRINT@41,"and";
```

```
130 POKE1068,32:PRINT@45,"fracti
on";:POKE1077,32:PRINT@54,"gener
ator";:POKE1087,32:PRINT@64,STRI
NG$(32,163);CHR$(175);:RETURN
140 FORI=0TO8:PRINT@127+(I*32),E
B$;:NEXT:PRINT@133,CHR$(175);CHR
$(174);STRING$(18,172);CHR$(173)
;CHR$(175);
150 PRINT@165,LC$;" 1) ? IS 5% O
F 20 ";RC$;:PRINT@197,LC$;" 2) 5
 IS ?% OF 20 ";RC$;:PRINT@229,LC
$;" 3) 5 IS 5% OF  ? ";RC$;:PRIN
T@261,LC$;" 4) COMBINATION   ";R
C$;:PRINT@293,LC$;" 5) FRACTIONS
      ";RC$;
160 PRINT@325,CHR$(175);CHR$(171
);STRING$(18,163);CHR$(167);CHR$
(175);
170 PRINT@384,STRING$(32,172);:P
OKE1440,32:POKE1441,32:POKE1442,
32:POKE1443,32:POKE1444,32:PRINT
@421,"press";:POKE1450,32:PRINT@
427,"desired";:POKE1458,32:PRINT
@435,"category";:POKE1467,32:POK
E1468,32
180 POKE1469,32:POKE1470,32:POKE
1471,32:PRINT@448,STRING$(32,163
);STRING$(31,128);:POKE1535,128
190 X$=INKEY$:KE=RND(-TIMER):IF
X$=""THEN190
200 IF X$="1"THEN G=1:CH=1:GOTO2
70
210 IF X$="2"THEN G=2:CH=2:GOTO2
70
220 IF X$="3"THEN G=3:CH=3:GOTO2
70
230 IF X$="4"THEN G=0:CH=0:GOTO2
70
240 IF X$="5"THEN560
250 GOTO190
260 IF CH=0 THEN290
270 REM START PERCENTS
280 SN=TIMER
290 PRINT@452,"ENTER LARGEST NUM
BER";:INPUTA:IFA=0THEN RUN
300 CLS4:PRINT@192,STRING$(96,12
8);:PRINT@229," NOW PRINTING SHE
ETS. ";
310 PRINT#-2,CHR$(31)
320 PRINT#-2,"NAME..............
..........DATE........"
330 PRINT#-2,"SHEET NUMBER "SN
340 PRINT#-2," ":PRINT#-2," "
350 FORZ=1TO10
360 N(1)=RND(A):D=RND(10):N(2)=N
(1)*D:N(3)=INT(N(1)/N(2)*100)
370 FORI=1TO3:N$(I)=STR$(N(I)):W
=LEN(N$(I))
380 FOR F=1 TO 4-W:N$(I)=" "+N$(
```

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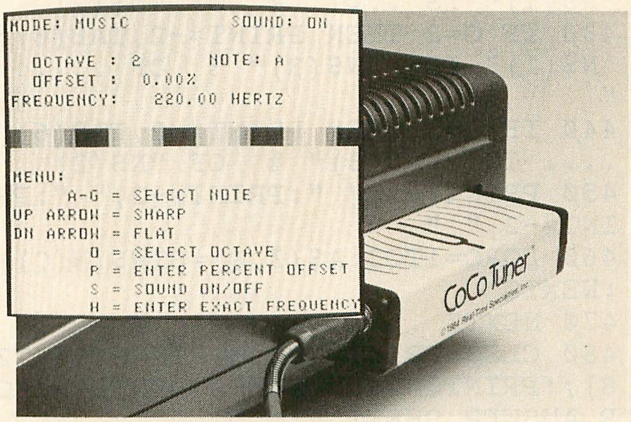

```
MODE: MUSIC              SOUND: ON

 OCTAVE : 2          NOTE: A
 OFFSET :  0.00%
FREQUENCY:    220.00 HERTZ


MENU:
     A-G = SELECT NOTE
UP ARROW = SHARP
DN ARROW = FLAT
       O = SELECT OCTAVE
       P = ENTER PERCENT OFFSET
       S = SOUND ON/OFF
       H = ENTER EXACT FREQUENCY
```

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City ______ State ______ Zip ______
Signature ____________

```
I):NEXTF
390 NEXTI
400 PRINT#-2,Z"."
410 IF CH=0 THEN G=RND(3)
420 IF G=1 THEN PRINT#-2,TAB(6);
 N$(1)" IS ..... % OF "N$(2)
430 IF G=2 THEN PRINT#-2,TAB(6);
 N$(1)" IS "N$(3)" % OF ......
"
440 IF G=3 THEN PRINT#-2,TAB(6)"
.... IS "N$(3)" % OF "N$(2)
450 PRINT#-2," ":PRINT#-2," ":PR
INT#-2," "
460 FORQ=1TO3:A$(Z,Q)=STR$(N(Q))
:NEXTQ
470 NEXTZ
480 CLS3:PRINT@192,STRING$(96,12
8);:PRINT@224," PRESS <ENTER> FO
R ANSWER SHEET ";
490 X$=INKEY$:IFX$<>CHR$(13)THEN
490
500 CLS6:PRINT@192,STRING$(96,12
8);:PRINT@226," NOW PRINTING ANS
WER SHEET. ";
510 PRINT#-2,CHR$(31)TAB(8)"SHEE
T NUMBER"SN:PRINT#-2," "
520 FORI=1TO10
530 PRINT#-2,TAB(6);I;". "A$(I,1
)" IS "A$(I,2)" % OF "A$(I,3)
540 PRINT#-2," ":NEXTI
550 RUN
560 CLS3:PRINT@192,STRING$(96,12
8);:PRINT@224," ENTER MAX. DENOM
INATOR ";
570 INPUTA
580 SN=TIMER
590 CLS4:PRINT@192,STRING$(96,12
8);:PRINT@229," NOW PRINTING SHE
ETS. ";
600 PRINT#-2,CHR$(31)"NAME......
.................DATE........."
610 PRINT#-2,"SHEET NUMBER "SN
620 PRINT#-2," "
630 FORZ=1TO10
640 B=RND(A)+1:IF B>A THEN 640
650 N(1)=B:N(2)=RND(B-1):Q=B*(RN
D(4)+1):N(3)=B*Q
660 L(Z,1)=N(1):L(Z,2)=N(2):L(Z,
4)=N(3):L(Z,3)=N(2)*Q
670 FORI=1TO3:N$(I)=STR$(N(I)):W
=LEN(N$(I))
680 FORY=1TO6-W:N$(I)=" "+N$(I):
NEXTY,I
690 PRINT#-2,Z;"."
700 PRINT#-2,TAB(6)N$(2)
710 PRINT#-2,TAB(9)"-----     =
   -----"
720 PRINT#-2,TAB(6)N$(1);TAB(20)
N$(3)
730 PRINT#-2," ":PRINT#-2," "
740 NEXTZ
750 FORI=1TO3:PRINT#-2," ":NEXTI
760 CLS3:PRINT@192,STRING$(96,12
8);:PRINT@224," PRESS <ENTER> FO
R ANSWER SHEET ";
770 X$=INKEY$:IFX$<>CHR$(13)THEN
770
780 CLS6:PRINT@192,STRING$(96,12
8);:PRINT@226," NOW PRINTING ANS
WER SHEET. ";
790 PRINT#-2,"SHEET NUMBER "SN
800 FORZ=1TO10
810 N(1)= L(Z,1):N(2)=L(Z,2):N(3
)=L(Z,3):N(4)=L(Z,4)
820 FORI=1TO4:N$(I)=STR$(N(I)):W
=LEN(N$(I))
830 FORY=1TO6-W:N$(I)=" "+N$(I):
NEXTY,I
840 PRINT#-2,Z;"."
850 PRINT#-2,TAB(6)N$(2);TAB(20)
N$(3)
860 PRINT#-2,TAB(9)"-----     =
   -----"
870 PRINT#-2,TAB(6)N$(1);TAB(20)
N$(4)
880 PRINT#-2," ":PRINT#-2," "
890 NEXTZ
900 PRINT#-2," ":PRINT#-2," "
910 RUN
```

One-Liner Contest Winner . . .

This program figures monthly loan payments. Just enter the principal, interest rate and number of years.

J.C. Longo
Oshawa, Ontario

The listing:

```
10 CLS:PRINT:INPUT" AMOUNT BORRO
WED";A:INPUT" INT. RATE (%)";R:I
NPUT" AMORTZN. PERIOD (YRS)";Y:K
=1+R/200:F=K^(1/6)-1:D=1-K^(-2*Y
):PRINT@161,"THE MONTHLY PAYMENT
 IS";INT(100*A*F/D+.5)/100:PRINT
@193,"MOLY. INT. FACTOR: ";:PRIN
TUSING".#########";F
```

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

"The CBASIC Compiler"

Now anyone can create fast efficient Machine Language Programs Easily and Quickly without having to use an Editor/Assembler

CBASIC is a fully integrated, easy to use Basic program Editor and Compiler package. CBASIC is 99% syntax compatible with Disk Extended Color Basic programs, so most Basic programs can be loaded and compiled by CBASIC with little or no changes required. The compiler is an optomizing two-pass integer Basic compiler that can convert programs written in Disk Extended Color Basic into 100% pure 6809 Machine Language programs which are written directly to disk in a LOADM compatible format.

The programs generated by the compiler can be run as complete stand alone programs. A built-in linker/editor will automatically select one and only one copy of each subroutine that is required from the internal run-time library and insert them directly in the program. This eliminates the need for cumbersome, often wasteful separate "run-time" packages.

CBASIC WAS DESIGNED FOR BOTH BEGINNING & ADVANCED USERS

CBASIC is a Powerful tool for the Beginner or Novice programmer as well as the Advanced Basic or Machine Language programmer. The Beginner or Novice programmer can write and compile programs without having to worry about Stack Pointers, DP registers, memory allocation, and so on, because CBASIC will handle it for you automatically. All they have to do is write their programs using the standard Basic statements and syntax. For the advanced Basic and Machine Language programmers, CBASIC will let you take command and control every aspect of your program, even generating machine code directly in a program for specialized routines or functions.

CBASIC adds many features not found in Color Basic, like Interrupt, Reset, and On Error handling. It also has advanced programming features that allow machine level control of the Stack and Direct Page registers, variable allocation, automatic 64K RAM control, program origin and even multiple origins. It can even have machine language code generated within a program that executes just like any other Basic program line.

FULL COMMAND SUPPORT & SPEED

CBASIC features well over 100 Basic Commands and Functions that fully support Disk, Tape, Printer and Screen I/O. It also supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Extended Color Basic, and all with 99.9% syntax compatibility.

CBASIC is FAST. Not only will CBASIC compiled programs execute 10 to 1000 times faster than Basic, but the time it takes to develop a CBASIC program versus writing a machine language program is much, much shorter. A machine language program that might take several months to write and debug could be created using CBASIC in a matter of days or hours, even for a well experienced machine language programmer. We had a report from a CBASIC user that claimed "a Basic program that used to take 3 hours to run, now runs in 7 to 8 minutes". Another user reported a program that took 1 to 1½ hours to run in Basic, now runs in 5 to 6 minutes!!!

MORE THAN JUST A COMPILER

CBASIC has its own completely integrated Basic Program Editor. The Editor contained in CBASIC is used to Create and/or Edit programs for the compiler. It is a full featured editor with functions designed specifically for writing and editing Basic programs. It has built-in block Move and Copy functions with automatic program renumbering. Complete, easy to use inserting, deleting, extending and overtyping of existing program lines. It is also used for Loading, Saving, Appending (merging), Killing disk files and displaying a Disk Directory. It also has automatic line number generation for use when creating programs or inserting sequencial lines between existing lines. You can set the printer baud rate and direct normal or compiled listings to the printer for hard copy. The built-in editor makes program corrections and changes as easy as "falling off a log". If CBASIC finds an error when compiling, it points to the place in the program line where the error occurred. All you have to do is tell the editor what line you want to start editing and when it is displayed, move the cursor with the arrow keys to the place where the error is and correct it. Just like that, it's simple.

HI-RES & 80 COLUMN DISPLAYS

CBASIC is the only Color Basic Compiler that includes its own Hi-Resolution 51, 64 or 85 by 24 line display. It is also the only compiler that supports both the PBJ "Word-Pak" and the Double Density 80 column cards. All of these display formats are part of the standard CBASIC compiler package. Not only can these display formats be used for normal program editing and compiling, but CBASIC will also include them in your compiled programs! If you want CBASIC to include the display driver in your program, all you have to do is use a single CBASIC command "HIRES". The run-time display driver that CBASIC includes in your program is not just a simple display, but a full-featured display package. With the Hi-Resolution display package you can mix text & graphics, change characters per line, underline, character highlight, erase to end of line or screen, home cursor, home & clear screen, protect screen lines, and much more. All commands are compatible with our HI-RES II Screen Commander so you can easily develop screen layouts using HI-RES and Color Basic before you compile your program. The same applies to using the 80 column card drivers. What other Basic compiler offers you this kind of flexibility?

64K RAM SUPPORT

CBASIC makes full use of the power and flexibility of the 6883 SAM (Synchronous Address Multiplexer) in the Color Computer. It will fully utilize the 96K of address space available in the Color Computer (64K installed) during program Creation, Editing and Compilation. CBASIC has a special command for automatic 64K RAM control. When used in a program, it allows the user to use the upper 32K of RAM space automatically for variables or even program storage at run-time. It will automatically switch the ROMs in and out when needed. There are also two other commands that allow you to control the upper 32K of RAM manually, under program control. No other Color Basic compiler directly supports the use of 64K RAM like CBASIC.

ALL MACHINE LANGUAGE

CBASIC is completely written in fast efficient Machine Language, not Basic, like some other Color Basic compilers. Because of this, CBASIC can edit and compile very large programs. Even using the Hi-Resolution 51 by 24 line display, it can work with about a 34K program, and the 80 column card versions can handle almost 40K of program. Some of the other Basic compilers can only work with 16K or about 200 lines. Even working with large programs, CBASIC compiles programs with lightning fast speed. It will compile a 24K program to disk in less than 2 minutes! That's without a listing being generated. We've heard stories about some other compilers that take almost 10 minutes to compile a simple 2-3K program. You might inquire about this when you look at some of the other compilers available.

THE FINISHED PRODUCT

Since CBASIC contains statements to support ALL of the I/O devices (Disk, Tape, Screen & Printer), Hi-Res Graphics, Sound, and Enhanced Screen displays, it is well suited for a wide range of programming applications. It generates a complete, Ready to Run machine language program. The finished product or program does not have to be interfaced to a Basic program to perform some of its functions or commands. This may seem obvious to you, but some of the other Color Basic compilers don't necessarily work this way. Some of their compiler commands need a separate Basic program in order for them to work. In some cases, require that a separate Basic program be interfaced to the compiled program to perform I/O functions, like INPUT, PRINT and so on. CBASIC doesn't do this. ALL of its commands are compiled into a single machine language program that does not require any kind of Basic program to make it work.

COMPATIBILITY

You may be wondering about those statements we made earlier concerning 99% or 99.9% syntax compatibility. What does that other 1% consist of? The biggest part of that 1% has to do with string arrays and variables. CBASIC does not use a "String Pool" like Color Basic. It uses absolute memory addresses to locate string variables and arrays. This is why CBASIC's string processing is so fast, it also eliminates the time consuming "Garbage Collection" problem. When CBASIC allocates space for strings, it must know how much space to use for each string. When you Dimension a string variable in CBASIC, you must tell it how much space you want to save for each element. To Dimension an array of 40 strings, 64 characters each, you would DIM DA$(40,64). If a string is not dimensioned, CBASIC will automatically allocate 32 bytes for it. If you want a single string to have enough room for 200 characters you would DIM AX$(200). For string arrays, you would still access the element you want, the same as Color Basic, to get string #30 from the array DA$, you would still use DA$(30), the only real change is in the DIM statement. For undeclared string arrays of 10 elements or less, CBASIC will automatically reserve space for 10 (0-9) strings of 32 characters. In some other Color Basic compilers, you have to declare EVERY string variable used in the progrm in a DIM statement. And, to create an array of 40 strings with 64 characters each, you would have to DIM AD$(2560), and then to access string #30, you would have to multiply 30 × 64 and use a special variable name format or access it one character at a time. Not very compatible or convenient to use, and difficult at best.

CBASIC REQUIREMENTS

CBASIC requires a minimum of 32K RAM and at least one Disk drive. We strongly recommend that you have 64K. CBASIC is compatible with all versions of Color & Extended Basic and both Disk Basic V1.0 and V1.1. Programs compiled on either system will run on systems with different ROMs. CBASIC is NOT compatible with JDOS.

DOCUMENTATION

The Documentation provided with any program is very important to the user. This is especially true when you talk about a program as complete and complex as CBASIC. Even though CBASIC was designed to be the most User Friendly compiler on the market, we went to great lengths to provide a manual that is not only easy to use and understand, but comprehensive and complete enough for even the most sophisticated user. The manual included with CBASIC consists of approximately 120 pages of real information, not like some manuals that put just one or two short paragraphs on a page. If we did it that way, we could have easily created a three or four hundred page manual. The manual index breaks down each section of the manual and gives a 3 or 4 word description of each section and its items along with page numbers. The manual has three sections, the Editor, Compiler and Appendix. Each of these is divided into subsections, with Section and Subsection titles printed at the top of each page. If you want to, you could find the information you are looking for by simply flipping through the pages and scanning the Section titles on the top of the pages. The Manual itself is an 8½ by 11 Spiral Bound book with durable leather textured covers. Some of the reports we have had from CBASIC users describe the manual as being the Best program manual they have ever used.

COMPARE THE DIFFERENCE

CBASIC is not just another Color Basic Compiler. It is the only complete Basic Compiler System for the Color Computer. Compare CBASIC's features to what other compilers offer and you'll see the difference. When comparing CBASIC to other compilers, you might want to keep some of these questions in mind. Does it support I/O functions? You can't write much of a program without PRINT, INPUT and so on. What about complex string statements, or string statements at all? How large of a program can you write? Can you compile a complex string like: MID$(RIGHT$(DA$(VAL(IN$),LEN(LE$)),3,3)? Can you use two character variable names for string & numeric variables, like Basic. Does it support all the Hi-Res graphics statements including PLAY, DRAW, GET and PUT, using the same syntax as Basic? Do you ever have to use a separate Basic program? Can you take complete Basic programs and compile them without extensive changes? Will they work? How do you edit a program when it has errors compiling?

PRICE VERSUS PERFORMANCE

The price of CBASIC is $149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. We spent over 2 years writing and refining CBASIC, to make it the Best, most Compatible Color Basic compiler available. Most of our CBASIC users already bought one or more of the other compilers on the market and have since discarded them. We even traded in a few of them. If you want a cheap compiler, we'll sell you one of those traded in, at a good price. Before you buy a compiler, compare the performance of CBASIC against any Color Basic compiler. Dollar for Dollar, CBASIC gives you more than any other Color Basic compiler available.

ORDERING INFORMATION

To order CBASIC by mail, send check or money order in the amount of $149.00 plus $3.00 for shipping and handling to the address listed below.

To order by VISA, MASTERCARD or COD, call us at: (702) 452-0632 (Monday thru Saturday, 8am to 5pm PST).

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Putting The Finishing Touches On The Analog-To-Digital Converter

By Tony DiStefano
Rainbow Contributing Editor

This month we'll finish the analog-to-digital project we started last month. The most important part of this project is the chip that does all the work. There are many chips on the market today, ranging from very cheap and slow to extremely fast and expensive. My budget (and I am sure I'm not alone) is very tight. I found this chip in a local electronics surplus store and paid a little less than two dollars for it. The chip is the Teledyne Semiconductor number 8700CJ. It is an eight-bit analog-to-digital converter.

This converter is a fully self-contained, single 24-pin, dual in-line package. The circuit requires only passive support components. The conversion technique used in this chip is a bit different than the one I talked about last month, but the net results are quite the same. Conversion is performed by an incremental charge balancing technique that has inherently high accuracy, linearity and noise immunity.

An amplifier integrates the sum of the unknown analog current and pulses of reference current. The number of pulses (charge increments) needed to maintain the amplifier summing junction near zero is counted. At the end of conversion the total count is transferred into the eight digital outputs. Figure 1 shows the pinout of the 8700CJ analog-to-digital converter. The following is a pin-by-pin description of this converter.

Pin #	Description
1 to 4	No connection
5 to 12	Eight data lines — These output-only data lines represent the eight-bit value as a result of the conversion. Pin #5 is the most significant bit, Bit 7. Pin #12 is the least significant bit, Bit 0.
13	Iref — This the reference input current used to compare to the unknown current.
14	Iin — This is the unknown input current to be measured.
15	AMPout — The output of the first comparator. Used to limit high frequency oscillation.
16	ZEROadjust — This input is used to adjust so a zero voltage will be accurate.
17	Ibias — This input current adjusts between the speed of the conversion and the supply current. The faster the conversion, the more current it requires.
18	VSS — This pin requires 5 volts power supply.
19	VDD — This pin requires +5 volts power supply.
20	GND — This pin is the system ground.
21	INIT — This pin is a TTL level input used to start the conversion process. Can also be connected to be free-running.
22	BUSY — This pin is a TTL level output. When it is high (logic 1), the converter is busy calculating the next value.
23	VALID — This pin is a TTL level output that is high when the data at the eight data pins is latched with valid data.
24	Another pin with no connection.

Figure 2 shows the circuit I designed for this project. IC #2 is the converter chip — it is the heart of the project. All the pins described need not be repeated, however, there are a couple of other support chips that could use a little explanation.

The first (IC #1) is a 74LS374. This is an eight-bit, D-Type flip-flop with tristate outputs. It is used to store the data produced by the converter and to act as a buffer to the computer. The converter

---

(Tony DiStefano is well-known as an early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.)

is wired in a free-running mode. That means as soon as it is finished doing a conversion, it immediately starts again as opposed to waiting for a signal from the computer to do another conversion. The *data valid* pin of the converter is connected to the *clock* pin of the 374, therefore transferring valid data from the converter to the flip-flops. Data is transferred from the converter to the flip-flop on the rising edge of the signal only, therefore no data is lost when the converter is busy doing the next conversion.

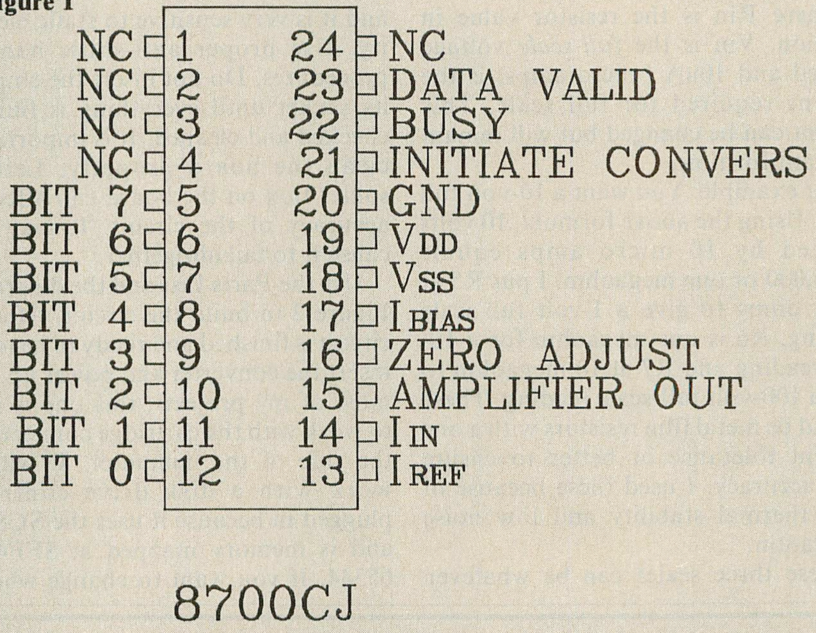
IC#3 is the other chip needed to make this work. It is a voltage regulator; a negative voltage regulator at that! It can take any negative input voltage from about -8 volts to -30 volts. The output will be a regulated -5 volts.

Why all this negative voltage? Well, the converter is kind of fussy that way. It needs -5 volts to work (something to do with the linearity I am told). If you are using a regular CoCo or a Multi-Pak Interface, there is no problem, but if you have a CoCo 2, you will have to fish out some negative voltage. (See last month's issue on how to do that.)

The 7905 is a three-pin chip that looks more like a power transistor than an IC. The pin numbers and description of this chip are simple. Looking at the chip and legs pointing downward, the left-most pin is ground. The center pin is the input and the right-most pin is the output. The IC does not need to be mounted on a heatsink; there is not enough power demanded of it. It also does not need a socket.

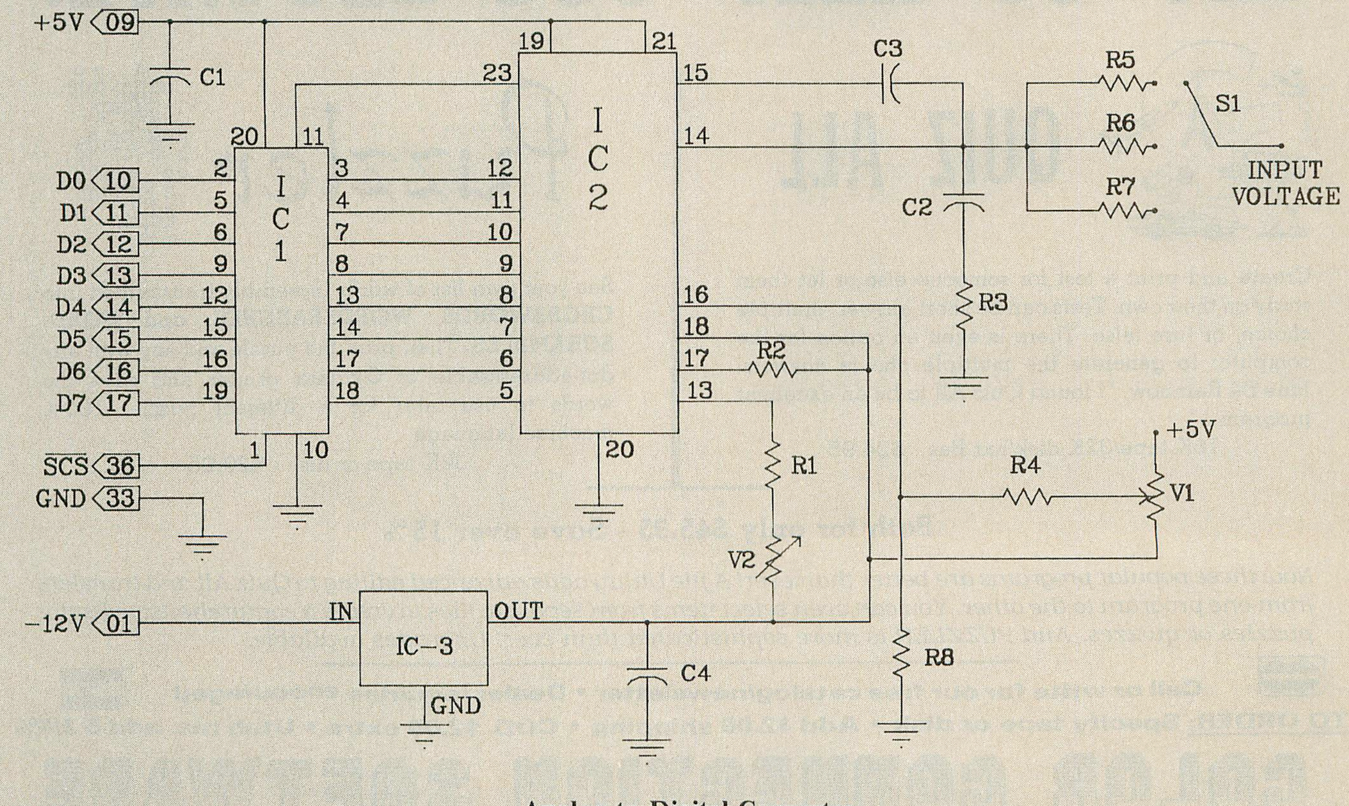
The rest of the parts are just to make the converter work properly. There are only two adjustments to make; I'll get to that later, but now I would like to focus your attention on the three resistors, R5, R6, R7, and switch S1. You may or may not want to include these in your final circuit. You may want even

Figure 1



NC 1
NC 2
NC 3
NC 4
BIT 7 5
BIT 6 6
BIT 5 7
BIT 4 8
BIT 3 9
BIT 2 10
BIT 1 11
BIT 0 12
24 NC
23 DATA VALID
22 BUSY
21 INITIATE CONVERS
20 GND
19 VDD
18 Vss
17 IBIAS
16 ZERO ADJUST
15 AMPLIFIER OUT
14 IIN
13 IREF
8700CJ

Figure 2



+5V 09
C1
D0 10
D1 11
D2 12
D3 13
D4 14
D5 15
D6 16
D7 17
SCS 36
GND 33
-12V 01
IC 1
IC 2
IC-3
IN
OUT
GND
C2
C3
C4
R1
R2
R3
R4
R5
R6
R7
R8
V1
V2
S1
+5V
INPUT VOLTAGE

Analog-to-Digital Converter

more than three resistors. It all depends on what you want to use this circuit for.

The input resistor, R5, R6 or R7, depending on which one is in circuit at the time, is a scaling resistor. The value of this resistor will determine what the full-scale voltage value will be. To determine the full scale voltage, you must follow this simple formula: Rin = Vin full scale / 10uA.

Where Rin is the resistor value in question, Vin is the *full-scale* voltage wanted and 10uA (micro amps) is the current required for full scale. This current can be changed but will remain constant for now.

For example: You want a 10-volt full scale. Using the above formula, 10 volts divided by 10 micro amps equals 1,000,000 or one megaohm. I put R5 at 100K ohms to give a 1-volt full-scale reading, R6 is one megaohm for a 10-volt reading and R7 at 10 megaohm to give a 100-volt full-scale reading. These should be metal film resistors with a one percent tolerance or better to ensure high accuracy. I used these because of their thermal stability and low noise generation.

These three scales can be whatever you choose. Just follow the formula and you won't go wrong. You can even add more resistors for more scales, but of course you will have to change the switch S1. If you need only one scale, only one resistor is needed and you won't need the switch either.

The construction is not too complicated, but care has to be taken because the 8700CJ converter is a CMOS chip and it is very sensitive to static electricity. Use proper anti-static handling procedures. Do not insert the chip into its socket until everything is finished, checked and cleaned. It is important to clean the board properly. Leftover solder flux on the board can affect the accuracy of the circuit. It may even cause it to fail altogether.

Use the Parts List and the diagram in Figure 2 to build the circuit. After the circuit is finished and ready to be tested, insert the converter and power up. Like most of my projects, this one is made to work with the cartridge connector on the side of the computer. It will not work with a disk drive controller plugged in because it uses the SCS line and is memory mapped at $FF40 or 65344. If you want to change where it is mapped, read my article, "How to Follow a Memory Map," in the June 1985 RAINBOW. It will, however, work with a Multi-Pak Interface.

Follow the procedures with the MPI to set it up. In order to see if all is working well, a simple program is necessary.

```
10 CLS
20 PRINT @0, PEEK(65344) : GOTO 20
```

Run the program. Touch and let go the junction of C3 and C2 with your finger. The number on the screen should change value. If it does, all is well and you are ready for the adjustment procedures. If it dosen't, check over the circuit, repair the problem and try again.

The adjustment procedure is simple. The first adjustment is the *zero adjust.* Ground the input, that is, add a jumper from the input pin to ground. Adjust V1 until the value on the screen reads zero. Increase V1 until it just changes to one and then back off until it changes back to zero. Now remove the ground clip and enter a reference voltage. This reference voltage should be the full-scale voltage of the resistor selected

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above. This is the full-scale adjustment. For instance, if R6 is selected and the value is one megaohm, the full-scale voltage is 10 volts. Put a known 10-volt source to the input.

Different resistor values require different full-scale voltages. Adjust V2 until you read 254. Increase V2 until it just turns to 255. Go back to the zero adjust and check it again. Do this until both adjustments are right. If your values for R5, R6 and R7 are accurate all the other scales will follow. The accuracy depends on the accuracy of these resistors. If you are a real stickler, you can add a trim pot on every resistor and adjust each full-scale separately. That is all the adjustments you have to do.

That covers the hardware end of an analog-to-digital converter. There are a few things to remember about the circuit. First of all, it is only good for positive voltages. Negative voltages will register only as zero. It will not, however, hurt the converter. There is a way of biasing the converter to except negative voltages. If enough readers are interested, I'll do another article on how to expand on this converter.

The input impedance depends on the full-scale resistor. It will typically range from 100K ohms to about 10 megaohms. The possible uses for this type of circuit are endless. First, it is a voltage meter, used for measuring voltages of batteries, transformers, adapters, other circuits and many more. But, for most of these items it is simpler to use a $5 Radio Shack volt meter.

So why the fancy-pants converter? Well, there are many purposes. With the proper input device, one could make a long term study of outside temperature patterns. Another would be the slow changes of alpha waves in meditation. With the right software you could use your computer as an oscillascope or even control the temperature of your house. I can think of many things, just use your imagination.

As always, if you have a question or a problem and absolutely can't wait for the post office, call me on Monday nights *only*, and after supper, at (514) 473-4910. If you write and want a response, include a self-addressed, stamped envelope; my address is 4680 18th Street, Laval Quest, Quebec H7R 2P9. Sorry, I don't do windows.

Parts List

IC1	—	74LS374 octal flip-flop
IC2	—	8700CJ eight-bit A-to-D (teledyne semiconductor)
IC3	—	7905 -5 volt regulator
R1	—	320K ohms ¼ watt
R2	—	100K ohms ¼ watt
R3	—	100 ohms ¼ watt
R4	—	100K ohms ¼ watt
R5	—	10K ohms ¼ watt one percent metal film
R6	—	1 meg ohms ¼ watt one percent metal film
R7	—	10 meg ohms ¼ watt one percent metal film
R8	—	1K ohms ¼ watt
C1	—	.1 uf 25 volts
C2	—	270 pf 25 volts
C3	—	68 pf 25 volts
C4	—	.1 uf 25 volts
V1	—	20K trim pot
V2	—	50K trim pot
S1	—	SPTT rotary switch
Misc.	—	24-pin socket, 20-pin socket, CoCo proto board, wire, solder, case, etc.

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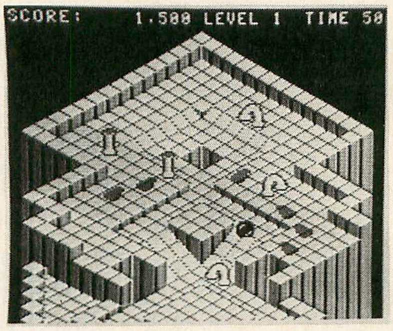
MARBLE MAZE



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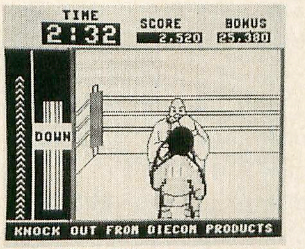

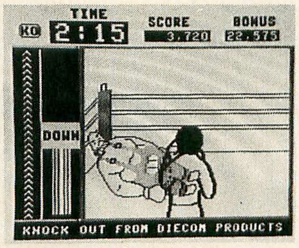

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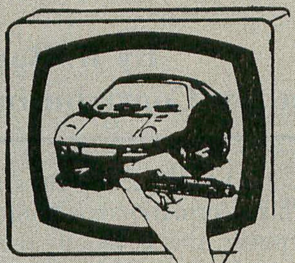

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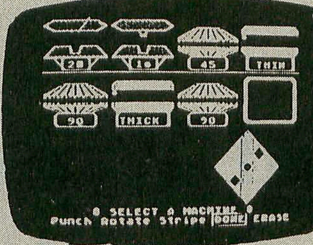

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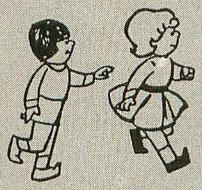

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The Long And Winding Road To Assembly Graphics

By R. Bartly Betts
Rainbow Contributing Editor

Sometimes the shortest way home is the longest way around, as my grandmother used to tell me. It was good advice when faced with the prospect of either climbing a perpendicular cliff or walking around the rocks.

This month it might be good advice when faced with the job of setting up your computer for assembly language graphics. It is a long trip to explain the process in detail but, when we get to the other side, the trip is going to seem worth the effort. Also, it is probably easier than trying to scale the cliff and take the short route.

Back in the Old Days

A number of people have asked about accessing graphics screens from assembly language. There has been a lot written about it, but often the information is difficult to understand.

Back in the days when Tandy sold the Non-Extended Color Computer, they also supplied a Color BASIC manual that contained information for accessing graphics pages directly. This was necessary because Color BASIC did not contain `PMODE`, `SCREEN` or `COLOR` commands. There was no way to obtain high resolution graphics except by directly manipulating the registers that set graphics pages and modes.

When Extended Color BASIC became the standard, there seemed no need for this information in a BASIC manual and it was excluded. However, this is exactly the information you need to access graphics in assembly language.

Graphics Background

As well, many Color Computer owners found it difficult to understand the information in the Color BASIC manual. It is still hard to obtain simple, easy-to-use information about the Color Computer's graphics capabilities. Usually manuals and articles assume readers already have basic graphics knowledge.

Graphics images consist of patterns of pixels (graphics blocks). For each pixel on the screen, you may choose two, four or eight colors, depending on the amount of detail desired. The degree of detail or definition is referred to as "resolution." In a two-color graphics mode, a pixel is either set (on) or reset (off). When it is set, it is the foreground color. When it is reset, it is the background color. However, in four-color modes, the pixels can be in any of four color conditions.

On the graphics screen, pixels are arranged in rows and columns. The lowest resolution screen is the text screen, consisting of 16 rows from top to bottom and 32 columns from side to side. To get a feel for how graphics work, imagine that the 'X' characters below each represent one screen position. The text screen is then arranged in this manner:

(R. Bartly Betts is currently a technical writer for Tandy Corp. and is a former news reporter and magazine editor. As the father of 10 children, computers are his escape from reality.)

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I used the text screen for my examples to save typing thousands of 'X' characters. The principle is the same for both the text and graphics screens. For instance, you can fill the screen with X's to see how this works. Use these BASIC commands to do the job:

```
10 FOR T=0 TO 511
20 PRINT @ T,"X";
30 NEXT T
```

Now, create a cross on the screen by replacing the 'X' characters with a space by adding these lines:

```
 40 PRINT @ 80, " "
 50 PRINT @ 112, " "
 60 PRINT @ 144, " "
 70 PRINT @ 174, "     "
 80 PRINT @ 208, " "
 90 PRINT @ 240, " "
100 PRINT @ 272, " "
```

This simple program starts at the middle of Line 3 (2 x 32 = 64 + 16 = 80) and prints a space. Because a line is exactly 32 columns wide, calculate the position immediately beneath the first by adding 32. The result is 112. Add 32 again for the next position; you get 144. The cross piece begins on the next line, but two spaces short of the middle, and contains five spaces. The next three positions follow immediately below.

```
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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XXXXXXXXXXXXXX     XXXXXXXXXXXXX
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```

On the text screen, this example takes up seven of the 16 screen rows and is quite large. However, using the highest resolution graphics screen, the same pattern could be smaller than a character on this page.

I realize this example seems extremely simple and perhaps somewhat boring, but it demonstrates the principles behind creating graphics with your computer. Perhaps such a simple example helps clear up some of the mystery behind computer graphics.

"Good" Resolution Needs Lots of Memory

Such "test" graphics are not very exciting because of the limitations of their size. However, the Color Computer has a total of eight graphics modes, five of which are accessible through Extended BASIC.

The number of pixels in graphics screen rows and columns depends on which of the graphics modes selected. Higher resolution uses smaller pixels. When using smaller pixels, it takes more of them to "fill" a screen. Because each pixel requires one bit of memory, higher resolution graphics require more memory.

The graphics mode selected also influences the shape of the graphics screen pixels. For instance, if you select a screen that has 64 pixels across and 64 pixels down, each pixel is square. However, if you select a screen that is 256 pixels across by 192 pixels down, the pixels are longer than they are wide. This is something to consider as you create images.

In the lowest resolution graphics, using `SET` and `RESET` on the text screen, the screen grid is 64 by 32, or 2,048 pixels. In the highest resolution graphics, the screen grid is 256 by 192, or 49,152 pixels.

Setting Graphics

There are five steps to establishing graphics screens. They are:

1) Determine what graphics mode you require.
2) Select the appropriate amount of RAM.
3) Clear the selected memory.
4) Switch in the Video RAM Page (the memory graphics page).
5) Set the graphics control register.

Choosing a Graphics Mode

The graphics mode used is up to you. The higher resolution graphics provide finer detail. For some applications this might be important, for others it might not. Table 1 shows what graphics modes are available.

Table 1

Resolution	Colors	Memory Required	BASIC PMODE
64x64	4	1024	N/A
128x64	2	1024	N/A
128x64	4	2048	N/A
128x96	2	1536	0
128x96	4	2048	1
128x192	2	2048	2
128x192	4	6144	3
256x192	2	6144	4

The first three modes are not implemented in BASIC, but can be chosen from assembly language if you wish.

Note that in the two-color modes there is only one bit required for every graphics "element" or pixel. For instance, the 128 x 64 two-color mode requires 1,024 bytes of memory (128 x 64 = 8,196 bits or 1,024 bytes). Four-color modes, however, require two bits for each pixel. For instance, the 128 x 192 four-color mode uses 6,144 bytes (128 x 192 x 2 = 49,152 bits or 6,144 bytes).

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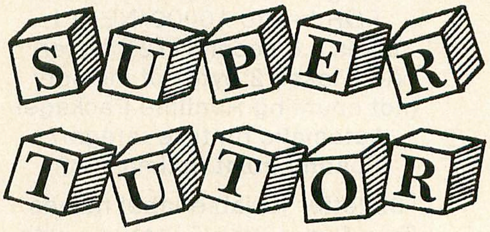

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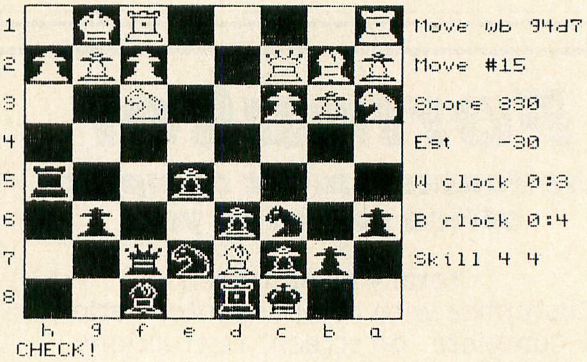

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Move #15
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W clock 0:3
B clock 0:4
Skill 4 4
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```

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Only one bit is required in the two-color mode because a set bit represents the foreground color and a reset bit represents the background color. A four-color mode requires two bytes for each pixel to provide the choice of four color combinations, 00, 01, 10 or 11.

To set any of the elements to the foreground color in the two-color mode, all you need to do is set the corresponding bit to one; each bit in a byte can have its own color. To reset the bit, set the appropriate bit to '0'.

In four-color modes, think of a byte consisting of only four elements, rather than eight. You set the color of any of the four elements by setting the two adjacent bits to either 0, 1, 2 or 3 (00, 01, 10, 11 in binary).

Did You Pass Your Binary Lessons?

Using high resolution graphics is where binary lessons really are of value. In a two-color graphics mode of 256 by 192 pixels, bytes have to be set in such a manner that you get the proper bit values. Every eight bits has to be treated as a unit even though they are individual units. In a four-color graphics mode, you have to treat every two bits as individual units within a four-unit environment. It might seem a little tricky now, but if you know your binary and Hex, it becomes easy with practice.

Once you have decided on the graphics mode, you have to select where the graphics "pages" will reside, and tell your computer. The pages can be put anywhere you wish in free RAM, but the top of memory is usually best. At the top of memory, it is easy to protect your graphics pages from being destroyed by a BASIC operation.

A "video page" is considered to be 512 bytes. Thus, when selecting video locations, use 512 byte units. For instance, if you have 32K of memory and wish to use the highest resolution, set aside 6,144 bytes of memory. Calculate the proper starting address for the graphics by subtracting 6,144 from the top of your computer's memory, for instance 32,512 - 6,144 = 32,368. Now, to find out which video page represents your selection, divide by 512 (32,368 divided by 512 = 51.5). Choose 51 as the nearest whole page that provides enough room.

You now need to convert 51 to a seven-bit binary number (0110011) and use that number to set the video page register, located from memory location 65478 to 65491 according to Table 2. The column labeled "Bit No." represents the bit location in a byte, with the right-most bit being '0' and the left most bit being '6'.

Table 2

Bit No.	This Location Resets	This Location Sets
0	65478	65479
1	65480	65481
2	65482	65483
3	65484	65485
4	65486	65487
5	65488	65489
6	65490	65491

If a bit is to be set (equals 1), set the first odd-numbered memory location. If the bit is reset (equals 0), set the first even-numbered memory location. The binary number is read from right to left and the procedure follows the example in Table 3.

Table 3

Binary Number Right to Left	Set This Number Even	Odd
1		65479
1		65481
0	65482	
0	65484	
1		65485
1		65487
0	65488	

If this seems confusing, remember that you start at the right of your binary number and move left. Set the next odd memory address if the bit is '1', or set the next even address if the bit is 0. In this case, "set" means to put any value into the address. For instance, from BASIC you could do the following pokes:

```
POKE 65479,0
POKE 65481,0
POKE 65482,0
POKE 65484,0
POKE 65485,0
POKE 65487,0
POKE 65488,0
```

As you see, '0' is a valid "value." You could use 1 or 100 or 205, if you wish. From assembly language you could use whatever value happens to be in Register A and store it in memory:

```
STA 65479
STA 65481
STA 65482
    . . . and etc.
```

Clearing Video Memory

Once the video pages have been calculated and set, you might want to clear the memory to prepare it for whatever applications you plan. A simple way is to establish the beginning and end of memory to clear and use a loop to store each byte with '0'. Calculate the beginning address by multiplying 51 by 512 for an answer of 26,112. The lines to do the job might look like this:

```
        LDX     #26112
        LDA     #0
CLEAR   CMPX    #32512
        BEQ     DONE
        STA     ,X+
        BRA     CLEAR
DONE    RTS
```

Setting the VDG Register

The first step in setting the graphics mode is to set the VDG register. This is a three-byte memory location that is set using a value from Table 4.

Table 4

Video Control Value

Graphics Mode Mode	VDG Pattern	To Select Color Set 0 / 1
SG6	000	16 / 24
SG8	010	0 / 0
SG12	100	0 / 0
SG24	110	0 / 0
G1C	001	128 / 136
G1R	001	144 / 152
G2C	010	160 / 168
G2R	011	176 / 184
G3C	100	192 / 200
G3R	101	208 / 216
G6C	110	224 / 232
G6R	110	240 / 248

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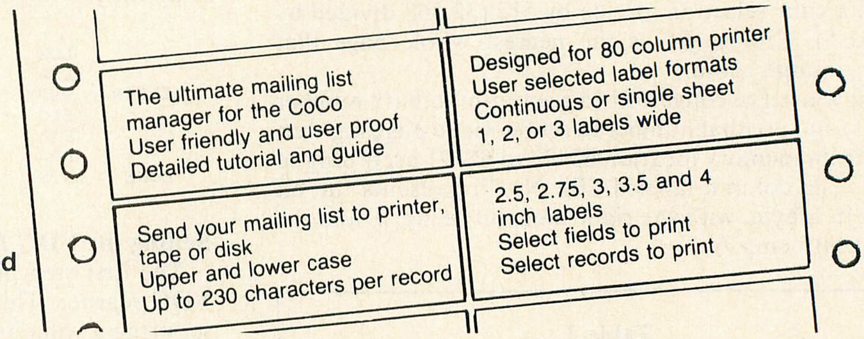

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- Summary of the player, goalie, and opposing team's stats
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- Summarizes 16 individual player stats
- Track 14 goalie stats
- Summarize 10 goalie stats
- Track 19 opposing team stats

baseball

Baseball will provide:

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- Correct and review all stats in file
- Correction on all input screens
- Raw dump of data to the printer — for the player, pitcher, and opposing team's files
- Summary of the player, pitcher and opposing team's stats
- Track 21 individual player stats with 18 cum stats per player
- Track 15 individual pitcher stats with 11 cum totals per pitcher
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football

Football will provide:

- Mid-season entry, update and additions
- Correct and review all stats in file
- Correction on all input screens
- Raw dump of data to the printer — for the player and opposing team's files
- Summary of the player and opposing team's stats
- Track 90 individual player stats
- Summarizes 63 individual cum stats per player
- Summarize 17 cum team stats
- Summarize 28 cum opposing team stats
- Team summaries of 87 stats
- Comparative summary printouts 63 stats for your team
- Comparative summary printouts 62 stats for opposing team
- Over 350 possible stats!

basketball

Basketball will provide:

- Mid-season entry, update and additions
- Correct and review all stats in file
- Correction on all input screens
- Raw dump of data to the printer — for the player and opposing team's files
- Summary of the player and opposing team's stats
- Track 22 individual player stats with 18 cum stats per player
- Summarizes 17 individual player team stats
- Compile opposing team summary of 19 separate stats

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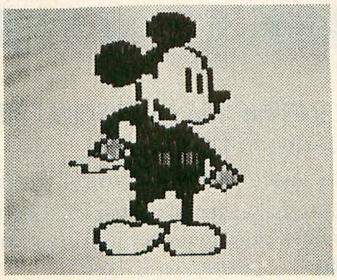
- Requires 16K



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Look up the three-bit VDG pattern that selects the graphics mode you want, Column 2. Set the VDG register, locations 65472 to 65477, in the same manner as before, that is, set the register locations according to the values of the three-bit pattern selected using Table 5.

Table 5

Bit No.	This Location Resets	This Location Sets
0	65472	65473
1	65474	65475
2	65476	65477

For instance, if you select G6C, the bit pattern is 110. Set the register in the following manner:

Table 6

Binary Number Right to Left	Set This Number Even	Odd
0	65472	
1		65475
1		65477

Again, you can set these register locations by storing any value in them, including '0'.

Setting the Control Value

To complete the task of setting your computer to put graphics to work, select the control value for the graphics mode desired from the third column of Table 4. Then use the value to set the control register located at 65314.

Tandy's manual states that you must store the selected control value without changing bits 0, 1 and 2 at location 65314. However, it doesn't seem that you can change these three least significant bits whether you want to or not. To demonstrate this, type the following:

```
PRINT PEEK (65314) <ENTER>,
```

The screen displays '4'. Then, if you type:

```
POKE 65314,0 : PRINT PEEK (65314) <ENTER>
```

The screen again displays '4'. Poking the location with '0' did not change the value. However, if you stored a value of 240 at location 65314, then peeked the location (as shown below), you find it now holds a value of 244. All but the three least significant bytes are changed:

```
POKE 65314,240 : PRINT PEEK(65314)
```

But, that's enough discussion. By storing the proper value in memory location 65314, you have completed graphics initialization.

Because of the ease with which you can experiment and make changes, I suggest trying the graphics initialization in BASIC before going to assembly language. Once you have worked out exactly what you want to accomplish in BASIC, transforming it to assembly language is quite easy. In fact, I think writing the assembly language program is easier than the BASIC one.

Until Next Time

I promised myself I wouldn't type an article any longer than could be handled by the 24K available to *Telewriter*. I have about reached my limit. However, you do have all the information needed to get the job done, so dig in and try graphics on your own.

Next month I will complete the assembly language graphics introduction and talk more about creating graphics images. In the meantime, have fun.

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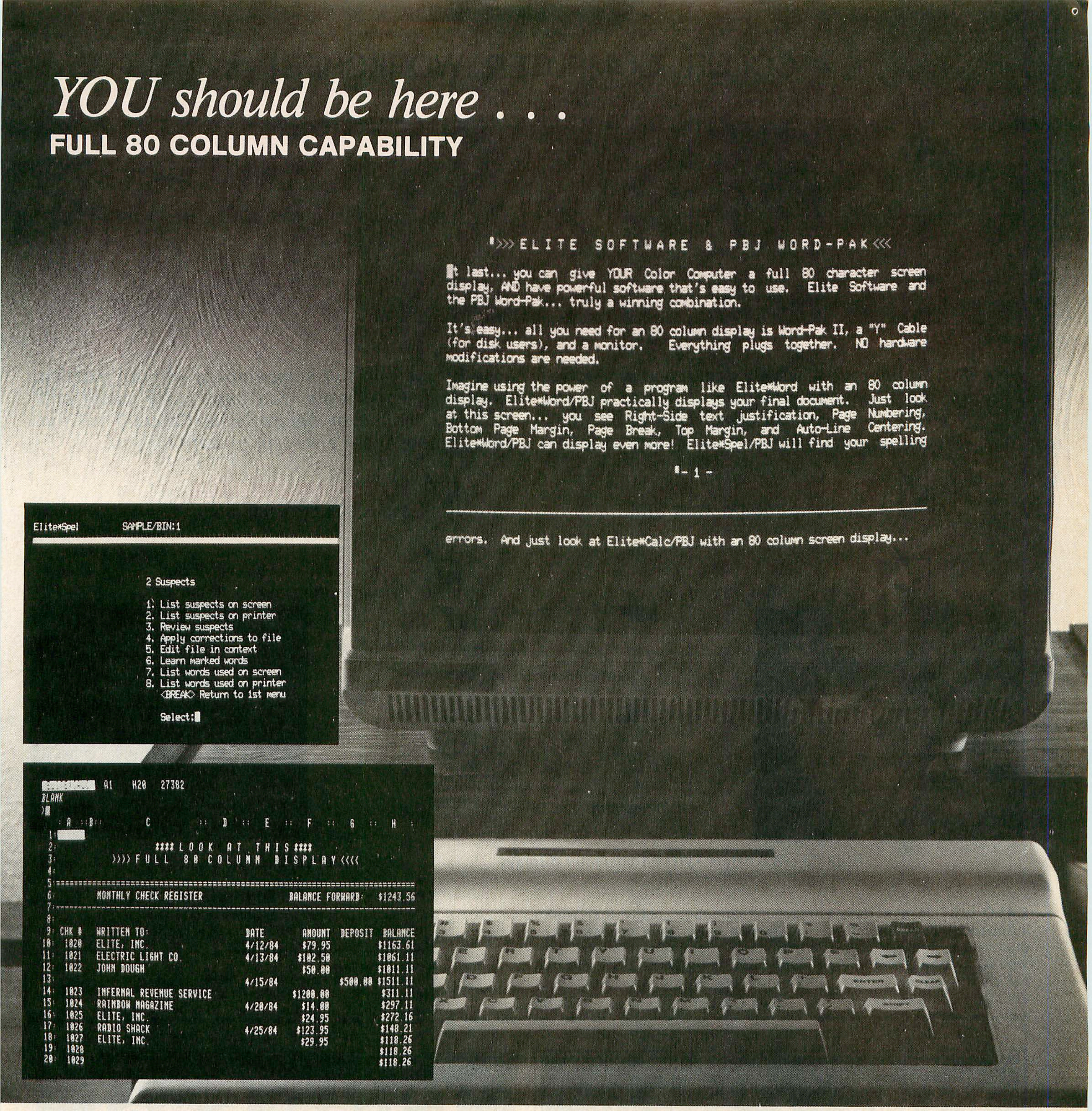

```
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                                  *- 1 -

________________________________________________________________________________

errors.  And just look at Elite*Calc/PBJ with an 80 column screen display...
```

```
Elite*Spel        SAMPLE/BIN:1

                  2 Suspects

                  1. List suspects on screen
                  2. List suspects on printer
                  3. Review suspects
                  4. Apply corrections to file
                  5. Edit file in context
                  6. Learn marked words
                  7. List words used on screen
                  8. List words used on printer
                     <BREAK> Return to 1st menu

                     Select:█
```

```
          A1    H20   27382
BLANK
>█
  : A :: B::         C          :: D :: E :: F :: G :: H :
 1:
 2:              **** L O O K   A T   T H I S ****
 3:         >>>> F U L L   8 0   C O L U M N   D I S P L A Y <<<<
 4:
 5:=========================================================================
 6:      MONTHLY CHECK REGISTER                 BALANCE FORWARD:   $1243.56
 7:-------------------------------------------------------------------------
 8:
 9: CHK #   WRITTEN TO:                DATE       AMOUNT  DEPOSIT  BALANCE
10:  1020   ELITE, INC.                4/12/84    $79.95           $1163.61
11:  1021   ELECTRIC LIGHT CO.         4/13/84   $102.50           $1061.11
12:  1022   JOHN DOUGH                            $50.00           $1011.11
13:                                    4/15/84            $500.00  $1511.11
14:  1023   INFERNAL REVENUE SERVICE            $1200.00            $311.11
15:  1024   RAINBOW MAGAZINE           4/20/84    $14.00            $297.11
16:  1025   ELITE, INC.                           $24.95            $272.16
17:  1026   RADIO SHACK                4/25/84   $123.95            $148.21
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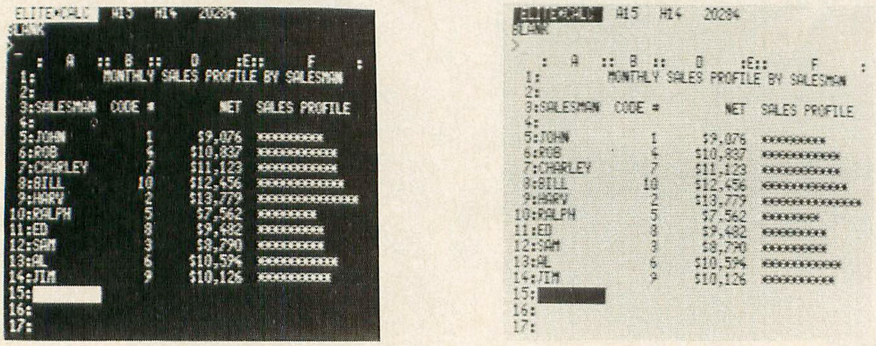
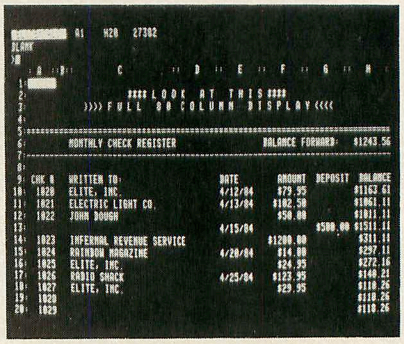


```
ELITE•CALC  A15  H14  20284
BLANK
>
  :  A  :: B ::  D   :E::   F     :
1:          MONTHLY SALES PROFILE BY SALESMAN
2:
3:SALESMAN  CODE #         NET  SALES PROFILE
4:
5:JOHN        1        $9,076  *********
6:ROB         4       $10,837  ***********
7:CHARLEY     7       $11,123  ***********
8:BILL       10       $12,456  ************
9:HARV        2       $13,779  **************
10:RALPH      5        $7,562  ********
11:ED         8        $9,482  *********
12:SAM        3        $8,790  *********
13:AL         6       $10,594  ***********
14:JIM        9       $10,126  **********
15:
16:
17:
```

Elite Calc/3.0 offers TWO 51 character displays



```
            A1    H20   27382
BLANK
>
 : A ::B::       C        :: D :: E :: F :: G :: H :
1:
2:            **** L O O K   A T   T H I S ****
3:        >>>> F U L L   8 0   C O L U M N   D I S P L A Y <<<<
4:
5:*******************************************************************
6:       MONTHLY CHECK REGISTER              BALANCE FORWARD:   $1243.56
7:-------------------------------------------------------------------
8:
9:  CHK #  WRITTEN TO:                 DATE     AMOUNT  DEPOSIT  BALANCE
10:  1020  ELITE, INC.                 4/12/84   $79.95           $1163.61
11:  1021  ELECTRIC LIGHT CO.          4/13/84  $102.50           $1061.11
12:  1022  JOHN DOUGH                            $50.00           $1011.11
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15:  1024  RAINBOW MAGAZINE            4/20/84   $14.00            $297.11
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17:  1026  RADIO SHACK                 4/25/84  $123.95            $148.21
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```

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MasterCard VISA

Microcomputers: Not Just A Student Learning Tool

By Michael Plog, Ph.D.
Rainbow Contributing Editor

When we talk about the computer's role in schools, too often we concentrate on student or teacher use of the machines. Indeed, some people think the computer's application in school is limited to student interaction with the electronic device, and generally limited to Computer Assisted Instruction (CAI). Some people expand the idea of computers in schools by thinking about how teachers can use the machines to help the process of classroom instruction.

We should not forget the administrator as an educational user of microcomputers. It is true that many administrative tasks are similar to things done in business applications, and many administrators have purchased business software to help them perform their duties.

Probably the first administrative function of the microcomputer is a word processing application. Administrators have found that the school secretary can prepare letters on the microcomputer better than on a typewriter. Form letters can now be "personalized" to parents and community groups.

Most large schools have a mini- or mainframe computer to handle such things as payroll or keeping a pupil database. For some applications, a microcomputer is not appropriate. For example, it would be difficult, almost impossible, to use the Color Computer to maintain a complete pupil database for two or three thousand students. The amount of information necessary for each student is massive, requiring lengthy records. On a microcomputer, there would be too many diskettes to shuffle, and it would take too much time to obtain printed results.

This does not mean the microcomputer has no benefits to offer administrators other than word processing. A small school district with a few hundred or less employees could easily assign the job of payroll and check printing to a microcomputer. A commercial database program, plus some "home grown" programming, could perform this job with less expense than would be needed on a mainframe.

It is true that most school district budgets are complex affairs, which can be more difficult than small-company budgets. School districts have different types of income; not all the money spent is from the local tax base. Some special programs providing money to schools must be maintained separately from other funds.

In addition, school district expenses have a different flavor than company expenses. Generally, money for personnel cannot be mixed with money for building expansion or other purposes. Different accounts have to be used for specific purposes. Since the nature and purpose of these accounts is usually prescribed by state law, the task of maintaining a district budget becomes huge compared to the total amount of money available to the school.

Keeping track of a single building budget, however, is a different job than maintaining a district budget. A principal can use a microcomputer to manage the budget of a single school with a simple commercial package such as a spreadsheet. The principal will have more current information and be able to make faster decisions, rather than relying solely on a mainframe report provided once a month from the district office. A microcomputer can even assist a principal in preparing monthly reports to the district.

School administrators have microcomputer applications beyond those of a small (or large) business. Some of the

---

(Michael Plog received his Ph.D. degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district and currently is employed at the Illinois State Board of Education.)

things school administrators have to do are very different from businesses, as well as from the classrooms. Even here, the microcomputer can help.

One of the painful tasks faced by secondary school administrators is class scheduling. This is only done once each year, but the task can take several days to complete. Matching students with courses and times of the day can become a job to tax the limits of any human. While the possible combinations are finite, that is hardly solace for the administrator.

Of course, the task is never as easy as it first seems. Not only must students be matched with correct classes, but most schools have class limits. And, if one class needs two sections, the sections should be about equal. After all, you cannot give one teacher 14 students and another 41 students.

While a difficult task, the microcomputer can assist with schedule creation. Some creative programming skills are necessary, but it is not impossible.

Other administrative tasks can benefit from using the microcomputer. Consider the job of maintaining bus routes, for example. For many rural districts, as well as some urban locations, the thought of organizing bus routes is enough to send an administrator searching for aspirin. This is similar to class scheduling: you have to match students with vehicles and vehicles with drivers. The objectives are to spend the least amount of money on gas, have each student spend the least amount of time riding the bus, have each bus run the minimum amount of miles and make sure all buses arrive at school on time.

There are, naturally, less complex tasks for the school administrator that can be eased by the use of a microcomputer. Attendance reports, for example, aren't too demanding a job for an organized person, but require a lot of clerical time. A microcomputer makes the clerical job much easier.

I have heard of one school district that used the microcomputer to keep attendance during the first period of the school day. Each teacher marked the absent students on a form, which was delivered to the office within 15 minutes after classes started. The office clerks entered the information into a computer (using code numbers) within 45 minutes of the start of school. An hour after school began, the counselor had a printed report with absent students listed, along with parents' names and telephone numbers. This was quickly matched against a list of students with excused absences for that day. The counselor spent the second hour of the school day calling parents. The truancy rate dropped in this school district. (After all, parents do not want to be disturbed at work to be notified that their children are absent from school!)

Lest you think this is unimportant, remember that for most states the amount of money a school district receives is related to the number of students in attendance each day. The school district can make more money on increased state aid than the cost of the computer and programming involved.

The application of microcomputer technology to reporting grade cards has been done in many schools. In fact, some schools use computerized grade cards to mail to parents, with appropriate messages and telephone numbers included on the printed report. This does not require much more than a commercial database package and some programming to enter grades into the appropriate students' records of the database. It's not too hard a job for students in a computer programming course, either.

Almost every school has student clubs and organizations. These clubs often have dues and expenses, such as trips, books, etc. A microcomputer can be helpful to the administrators who keep track of everything from the Chess Club to the local chapter of the National Honor Society.

In the short space available here, we have only begun to examine the possible uses of the microcomputer for school administrators. Many of the jobs done by administrators are "invisible" to the general public. Yet, schools could not exist without administrators. In fact, some research suggests the principal is the key role in the school district: Morale of teachers and students depends on the principal, as well as the smooth operation of daily activities. There are other administrators besides principals, and the microcomputer can be useful for many administrative procedures at all levels of the school system.

If you want to share your application of the microcomputer in schools, or react to my thoughts, please write me. I welcome comments even when I disagree with them. My address is 829 Evergreen, Chatham, IL 62629. ☐

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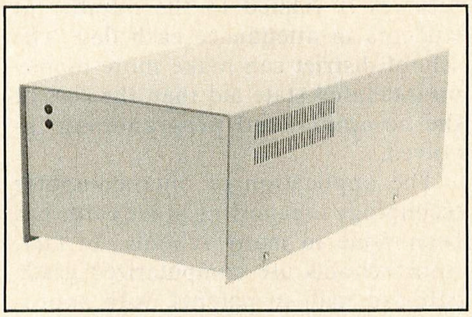

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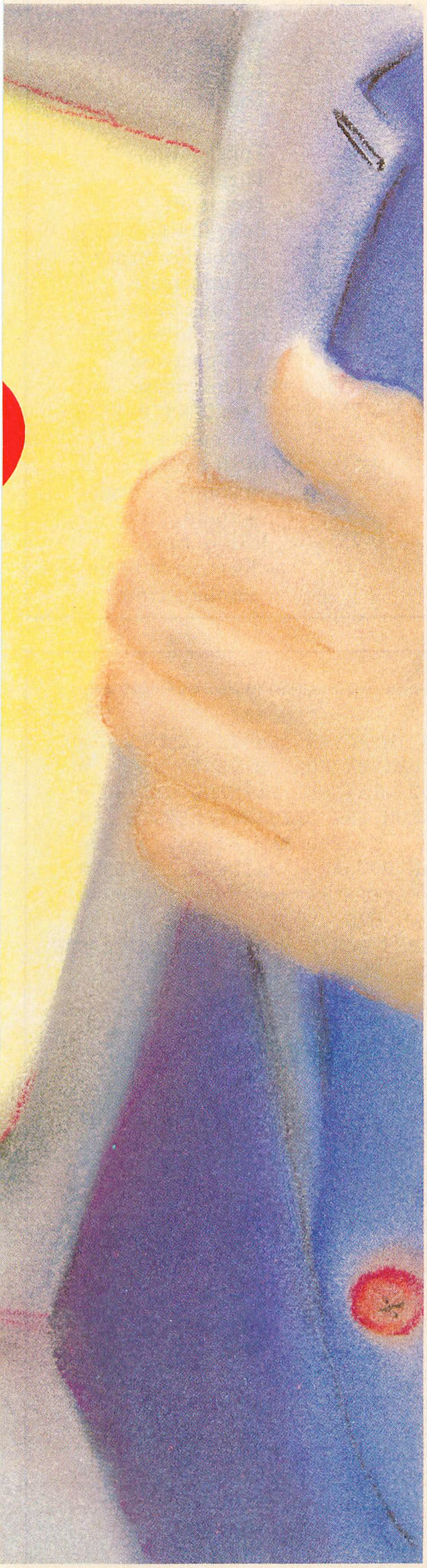

With a few bells and whistles added to a simple program, you can have . . .

More Power And Protection For Your BBS

By Scott M. Taylor

In the November 1983 Communications issue, RAINBOW published a program by Technical Editor Dan Downard called *Remote*. It was a remote terminal driver, or a program to allow input from and output to another computer or terminal via the CoCo's RS-232 serial port. This type of program is essential to anyone who operates a bulletin board system. *Remote* is a very simple program, but because it performs what is required of it so well, it is a perfect example of the "elegance of simplicity."

In the article that accompanied the program, Mr. Downard stated that if you had a serious application in mind, he would recommend a commercial driver — one with more "bells and whistles." *Remote* was intended to provide "a method of experimentation with a remote terminal."

I've had some experience with commercially available driver programs, but I like *Remote* better than any of them, considering the difference in cost and the fact that I had documented source code to boot. However, there are a few things the more expensive programs can do that *Remote* just can't handle. I felt the program needed a few enhancements. I wanted to transform *Remote* into a specially-designed, SysOp-oriented BBS driver program. That was what made me start digging around in my "bells and whistles" box.

The Bells

Most of the new features I have added are accessed by `POKE`s to the first nine bytes (&H7D00 through &H7D08) of the *Remote2* program. The majority of these are simply "toggle-switch" `POKE`s ('0' turns a feature off, any other value turns it on). However, some are slightly more complicated. All of these `POKE`s are listed and explained in Table 1.

The first addition to the program is a "break disable" feature. It will filter out a break signal (&H03) from the remote terminal. This can be disabled by a `POKE &H7D00,0`. Putting any other value into that location will enable the feature again. The program simply compares every key

---

(Scott Taylor is a senior at Piper High School in Piper, Kan., with three years experience in computer communications. He is interested in journalism and the use of computers in that field.)

pressed by the remote terminal operator to see if it is a BREAK key. If it is, the ASCII value is reset to zero so the CoCo will think no key was even pressed.

This will prevent BBS users from "breaking out" of your BBS program and into BASIC, where certain users find pleasure in reformatting disks or looking at secret password files. This does not disable the BREAK key on the CoCo, only that of the remote terminal.

The second feature of this program simply displays each character sent by the remote user in the corner of your screen. The character is stored in location &H41F, the upper right corner. If you wish to turn this feature off, type `POKE &H7D01,0`.

In the original *Remote* program, a linefeed was sent with every carriage return. In most cases this is standard procedure, but some terminal programs are capable of generating their own linefeeds upon receiving a carriage return. If you do not want linefeeds sent with carriage returns, type `POKE &H7D02,0`. As before, any other value will restore the function. This will allow a BBS user to alter your system (somewhat) to his own needs.

The next feature is useful for password protection. You may have noticed when entering your password on some BBSs, you do not see what you type in. You might type in a password such as "HELLO," but you will see "*****" or "XXXXX" on the screen. This is to keep your password secret.

When the value at location &H7D03 is zero, the driver will function as normal and echo the character that is typed. Any other value in that location will cause the computer to echo the ASCII character of that value. Typing `POKE &H7D03,42` will cause the computer to echo an asterisk. Always be sure to reset &H7D03 to zero after the password is entered, or the user will not be able to tell what your BBS is sending. Everything will appear as a big string of asterisks (or whatever character you choose).

As with the break disable function, this does not affect the CoCo itself, only the remote terminal. You will see the normal output on the CoCo screen regardless of what is echoed to the remote terminal.

The next two locations can be used for many purposes, but they are meant to provide further security for your BBS system. The first location, &H7D04, will allow you to control the input to your computer. If it contains a zero, all

Table 1

Function	Location	Poke	Result
Disable Break signal from remote terminal	7D00	0 1-255	Toggle off Toggle on
Display incoming character in corner of screen	7D01	0 1-255	Toggle off Toggle on
Send linefeeds with carriage returns	7D02	0 1-255	Toggle off Toggle on
Echo character to remote terminal	7D03	0 1-255	Toggle off Echo `CHR$(1-255)`
Input status (upper- or lowercase)	7D04	0 1 2-255	Upper/lowercase All uppercase All lowercase
Output status (upper- or lowercase)	7D05	0 1 2-255	Upper/lowercase All uppercase All lowercase
Cursor value	7D06	0-255	Uses `CHR$(0-255)` for cursor
Scroll protection (First location must be in the range of	7D07	4-5	MSB of first location to begin scrolling from
&H400-&H5E0)	7D08	0-255	LSB of first location to begin scrolling from

Listing 1: REMOTE2

```
                        00100 ************************************
                        00110 *              REMOTE2             *
                        00120 *  AN IMPROVED REMOTE TERMINAL *
                        00130 *     DRIVER FOR THE COCO BY       *
                        00140 * SCOTT TAYLOR  RAINBOW  11/85 *
                        00150 *    FROM THE ORIGINAL REMOTE      *
                        00160 *             PROGRAM BY           *
                        00170 *  DAN DOWNARD  RAINBOW  11/83 *
                        00180 ************************************
7D00                    00190           ORG      $7D00
                        00200 *EQUATES FOR ROM AND RAM ADDRESSES
          016A          00210 IHOOK     EQU      $016A
          0167          00220 OHOOK     EQU      $0167
          FF22          00230 PIA       EQU      $FF22
          A000          00240 POLCAT    EQU      $A000
          8E0C          00250 RSOUT     EQU      $8E0C
          00E6          00260 BAUD      EQU      $E6
          00B8          00270 BAUDR     EQU      $B8
          006F          00280 DEV       EQU      $6F
          0070          00290 FLAG      EQU      $70
7D00      01            00300 BREAK     FCB      $01
7D01      01            00310 CORNER    FCB      $01
7D02      01            00320 LFFLG     FCB      $01
7D03      00            00330 PRTFLG    FCB      $00
7D04      00            00340 ICASE     FCB      $00
7D05      00            00350 OCASE     FCB      $00
7D06      9F            00360 CURSOR    FCB      $9F
7D07      0400          00370 NOSCRL    FDB      $400
7D09      00            00380 COUNTR    FCB      $00
7D0A                    00390 TABLE     RMB      $28
                        00400 *INITIALIZE RAM HOOKS
7D32 86   B8            00410 START     LDA      #BAUDR
7D34 97   E6            00420           STA      <BAUD
7D36 BE   0168          00430           LDX      1+OHOOK
7D39 AF   8D 012D       00440           STX      1+NTSCRN,PCR
```

```
7D3D BE    016B       00450        LDX    1+IHOOK
7D40 AF    8D 01A4    00460        STX    1+IRET2,PCR
7D44 86    7E         00470        LDA    #$7E
7D46 B7    016A       00480        STA    IHOOK
7D49 B7    0167       00490        STA    OHOOK
7D4C 30    8D 0048    00500        LEAX   OUT,PCR
7D50 BF    0168       00510        STX    1+OHOOK
7D53 30    8D 0115    00520        LEAX   IN,PCR
7D57 BF    016B       00530        STX    1+IHOOK
                      00540 *MOVE TABLE OF ROM ADDRESSES
                      00550 *SET INKEY$ TO RAM BASED ROUTINE
7D5A 8E    AA29       00560 MOVTBL LDX    #$AA29
7D5D 31    8C AA      00570        LEAY   TABLE,PCR
7D60 10BF  0128       00580        STY    $128
7D64 EC    81         00590 GETADD LDD    ,X++
7D66 ED    A1         00600        STD    ,Y++
7D68 8C    AA51       00610        CMPX   #$AA51
7D6B 26    F7         00620        BNE    GETADD
7D6D 30    8D 0005    00630        LEAX   INKEY,PCR
7D71 31    3C         00640        LEAY   -4,Y
7D73 AF    A4         00650        STX    ,Y
7D75 39               00660 RET    RTS
                      00670 *CHECK KEYBOARD AND
                      00680 *RS-232 FOR INKEY$ 255
                      00690 *TIMES IF NOTHING IN $87
7D76 96    87         00700 INKEY  LDA    <$87
7D78 26    15         00710        BNE    YES
7D7A 86    FF         00720        LDA    #$FF
7D7C B7    7D09       00730        STA    COUNTR
7D7F AD    9F A000    00740 INKEY2 JSR    [POLCAT]
7D83 26    0A         00750        BNE    YES
7D85 BD    7E8C       00760        JSR    REMIN
7D88 26    05         00770        BNE    YES
7D8A 7A    7D09       00780        DEC    COUNTR
7D8D 26    F0         00790        BNE    INKEY2
                      00800 *CHARACTER IN A REGISTER
                      00810 *BRANCH IF BREAK (A=$03)
                      00820 *CONVERT TO STRING
7D8F 81    03         00830 YES    CMPA   #$03
7D91 1027  3074       00840        LBEQ   $AE09
7D95 7E    A56B       00850        JMP    $A56B
                      00860 *OUTPUT CHARACTER IF DEV=0
                      00870 *INSERT LINE FEEDS IF NEEDED
                      00880 *USE NEW PRINT ROUTINE
7D98 34    06         00890 OUT    PSHS   A,B
7D9A 0D    6F         00900        TST    <DEV
7D9C 1026  00C7       00910        LBNE   NTSCN1
7DA0 81    08         00920        CMPA   #$08
7DA2 27    1A         00930        BEQ    RMOUT2
7DA4 81    0D         00940        CMPA   #$0D
7DA6 26    0E         00950        BNE    REMOUT
                      00960 *CHECK IF LINEFEEDS ARE TO
                      00970 *BE SENT TO REMOTE TERMINAL
7DA8 F6    7D02       00980        LDB    LFFLG
7DAB 27    11         00990        BEQ    RMOUT2
7DAD 86    0A         01000        LDA    #$0A
7DAF BD    8E0C       01010        JSR    RSOUT
7DB2 86    0D         01020        LDA    #$0D
7DB4 20    08         01030        BRA    RMOUT2
                      01040 *ECHO CHARACTER IN PRTFLG
                      01050 *IF IT IS NOT EQUAL TO 0
7DB6 F6    7D03       01060 REMOUT LDB    PRTFLG
7DB9 27    03         01070        BEQ    RMOUT2
7DBB B6    7D03       01080        LDA    PRTFLG
                      01090 *CHECK OUTPUT FOR UPPER-
```

input will be upper- or lowercase as the user types it. If it contains a one, all input will be changed so that upper- and lowercase both appear as uppercase. If it is two, all input will be changed to lowercase.

This is also handy in case a crasher gets into BASIC on your system. Type `POKE &H7D04,2` and everything he types, whether it be in upper- or lowercase, will be changed to lowercase. `DSKINI0` is very hazardous to disks, but `dskini0` is completely harmless.

The second part of this feature will allow you to control output to the remote terminal. If &H7D05 contains a zero, the character echoed to the terminal will be the result of the poke to &H7D04. If &H7D05 contains a one, everything echoed to the terminal will be in uppercase. When &H7D05 contains a two, the output will be in lowercase.

This is a useful feature for converting lowercase to uppercase if a user cannot handle lowercase, but it can also be used to further confuse a crasher. Typing `POKE &H7D04,2` and `POKE &H7D05,1` will cause the computer to change all input to lowercase, but echo everything back in uppercase. If he types `DSKINI0`, the computer will take it as `dskini0`, but it will be echoed back to him in uppercase again. This will drive the average BBS crasher crazy!

Location &H7D06 holds the cursor value. The original *Remote* program had no cursor, which is confusing sometimes because it's hard to tell when the computer is waiting for input or when it is busy doing something else. The current cursor value, &H9F, gives a yellow block that shows up well on black-and-white televisions or monitors. This can also be changed to any value.

The next two bytes, &H7D07 and &H7D08, contain the address used by the scroll routine as the top of the screen. It currently contains the address &H400 (the first byte of the screen), so the scroll routine will function as normal. `POKE &H7D08,32` (&H20) to make the address &H420. This will cause the scroll routine to leave the first 32 bytes of the screen intact.

This can be used to display the current BBS user's name or ID at the top of the screen in the scroll-protected space so you can always tell at a glance who is on your system. You can scroll protect from any location in the range of &H400 to &H5DF. Anything outside that range will cause the scroll routine to scroll the screen as normal and ignore the protection feature.

A CLS statement will still clear the entire screen and you will lose the protected information. BREAKing the program will cause the first line to be lost if the BREAK causes the screen to scroll, but whatever comes up in the first line will still be protected.

The Whistle

The major feature of this program is that it allows the use of the INKEY$ command from BASIC. Using INKEY$ in a BBS program makes it operate very smoothly. INKEY$ allows some bulletin boards to respond to single-keystroke commands. It can also be used to allow the remote user to pause or stop output from the host computer. There are many features that can be added to a BBS with the INKEY$ command, which would otherwise be difficult or impossible to perform without it.

I have seen only one commercially available driver that allows the use of INKEY$, but it requires 64K. My friend, who has quite a bit of experience with terminal drivers and BBS programs, told me that in order to implement INKEY$ I would either have to get 64K and change the ROM routine itself, or use the 6809 interrupts to periodically check the RS-232 for an INKEY$ character.

I do not have 64K, so the first idea was out of the question. The interrupt method really slows down the operation of the computer, so I did not even try it. For a long time, I figured there was no way to implement INKEY$ in a 32K terminal driver; I gave up the idea.

A few months later, however, I found that in low RAM there are a number of pointers that point to tables in ROM. These tables contain the keywords and the addresses of the routines that make up Microsoft BASIC. I found by playing around with these pointers, the tables could be moved to RAM and altered. I simply moved the table of addresses located in ROM at &HAA29 through &HAA52 to RAM and changed the address of the INKEY$ routine to that of my own routine in the terminal driver. Now, whenever the computer sees INKEY$, it jumps to my routine instead of the one in ROM.

The INKEY$ routine in the terminal driver works almost exactly the same as the ROM routine, with a few minor differences. First of all, the CoCo now scans the RS-232 for an INKEY$ character as well as the keyboard. This slows

```
                    01100 *OR LOWERCASE AND SEND IT
7DBE F6   7D05      01110 RMOUT2  LDB     OCASE
7DC1 BD   7EC1      01120         JSR     CKCASE
7DC4 BD   8E0C      01130         JSR     RSOUT
7DC7 35   06        01140 ORET1   PULS    A,B
7DC9 34   34        01150 ORET2   PSHS    B,X,Y
                    01160 *CHECK FOR BREAK KEY
7DCB F6   0154      01170         LDB     $154
7DCE C1   BF        01180         CMPB    #$BF
7DD0 27   2C        01190         BEQ     PULL
7DD2 9E   88        01200         LDX     $88
7DD4 81   08        01210         CMPA    #$08
7DD6 27   38        01220         BEQ     BKSPC
7DD8 81   0D        01230         CMPA    #$0D
7DDA 27   67        01240         BEQ     ENTER
7DDC 81   20        01250         CMPA    #$20
7DDE 25   25        01260         BLO     PULL2
7DE0 81   1F        01270         CMPA    #$1F
7DE2 22   04        01280         BHI     CMP2
7DE4 86   60        01290         LDA     #$60
7DE6 20   20        01300         BRA     PUTIT
                    01310 *TRANSLATE ASCII VALUE TO
                    01320 *SCREEN CHARACTER VALUE
7DE8 81   3F        01330 CMP2    CMPA    #$3F
7DEA 22   04        01340         BHI     CMP3
7DEC 8B   40        01350         ADDA    #$40
7DEE 20   18        01360         BRA     PUTIT
7DF0 81   5F        01370 CMP3    CMPA    #$5F
7DF2 22   02        01380         BHI     CMP4
7DF4 20   12        01390         BRA     PUTIT
7DF6 81   7F        01400 CMP4    CMPA    #$7F
7DF8 22   0E        01410         BHI     PUTIT
7DFA 80   60        01420         SUBA    #$60
7DFC 20   0A        01430         BRA     PUTIT
7DFE 8C   0600      01440 PULL    CMPX    #$600
7E01 26   02        01450         BNE     PULL2
7E03 8D   18        01460         BSR     SCROLL
7E05 35   34        01470 PULL2   PULS    B,X,Y
7E07 39             01480         RTS
7E08 A7   80        01490 PUTIT   STA     ,X+
7E0A 9F   88        01500 FIXCUR  STX     $88
7E0C 86   0A        01510         LDA     #$0A
7E0E 20   EE        01520         BRA     PULL
7E10 108E 6060      01530 BKSPC   LDY     #$6060
7E14 10AF 82        01540         STY     ,-X
7E17 9F   88        01550         STX     $88
7E19 86   0A        01560         LDA     #$0A
7E1B 20   E8        01570         BRA     PULL2
                    01580 *CHECK IF SCROLL PROTECTED
                    01590 *AREA IS IN THE RANGE OF
                    01600 *$400 TO $5E0
                    01610 *SCROLL SCREEN
7E1D BE   7D07      01620 SCROLL  LDX     NOSCRL
7E20 8C   0400      01630         CMPX    #$400
7E23 25   05        01640         BLO     MAKEX
7E25 8C   05E0      01650         CMPX    #$5E0
7E28 25   03        01660         BLO     SCROL2
7E2A 8E   0400      01670 MAKEX   LDX     #$400
7E2D E6   88 20     01680 SCROL2  LDB     $20,X
7E30 E7   80        01690         STB     ,X+
7E32 8C   05E0      01700         CMPX    #$5E0
7E35 26   F6        01710         BNE     SCROL2
7E37 9F   88        01720         STX     $88
7E39 C6   60        01730         LDB     #$60
7E3B E7   80        01740 LASTLN  STB     ,X+
7E3D 8C   0600     01750          CMPX    #$600
7E40 26   F9       01760          BNE     LASTLN
7E42 39            01770          RTS
                   01780 *CLEAR TO END OF LINE IF
                   01790 *'ENTER' KEY IS PRESSED
7E43 96   89       01800 ENTER    LDA     $89
7E45 81   20       01810 COMP     CMPA    #$20
7E47 25   04       01820          BLO     ENT
7E49 80   20       01830          SUBA    #$20
7E4B 20   F8       01840          BRA     COMP
7E4D C6   60       01850 ENT      LDB     #$60
7E4F E7   80       01860          STB     ,X+
7E51 8C   0600     01870          CMPX    #$600
7E54 26   04       01880          BNE     INCRE
7E56 8D   C5       01890          BSR     SCROLL
7E58 20   07       01900          BRA     FINISH
7E5A 4C            01910 INCRE    INCA
7E5B 81   20       01920          CMPA    #$20
7E5D 26   EE       01930          BNE     ENT
7E5F 9F   88       01940          STX     $88
7E61 35   34       01950 FINISH   PULS    B,X,Y
7E63 CC   0A01     01960          LDD     #$0A01
7E66 39            01970          RTS
7E67 35   06       01980 NTSCN1   PULS    A,B
7E69 7E   7DC9     01990 NTSCRN   JMP     ORET2
                   02000 *INPUT FROM KEYBOARD OR RS-232
                   02010 *IF DEV=0
                   02020 *USE RSIN FOR REMOTE INPUT
7E6C B6   7D06     02030 IN       LDA     CURSOR
7E6F A7   9F 0088  02040          STA     [$88]
7E73 0F   70       02050          CLR     <FLAG
7E75 0D   6F       02060          TST     <DEV
7E77 26   6E       02070          BNE     IRET2
7E79 32   62       02080          LEAS    2,S
7E7B 34   15       02090          PSHS    B,CC,X
7E7D AD   9F A000  02100 IN1      JSR     [POLCAT]
7E81 27   02       02110          BEQ     RSCHK
7E83 20   60       02120          BRA     NOCHNG
7E85 BD   7E8C     02130 RSCHK    JSR     REMIN
7E88 27   F3       02140          BEQ     IN1
7E8A 20   53       02150          BRA     IRET1
7E8C F6   FF22     02160 REMIN    LDB     $FF22
7E8F 56            02170          RORB
7E90 25   2A       02180          BCS     ZEROA
                   02190 *RS-232 INPUT ROUTINE
                   02200 *BYTE INTO A REGISTER
7E92 8D   58       02210 RSIN     BSR     HALF
7E94 CC   0001     02220          LDD     #$1
7E97 34   04       02230          PSHS    B
7E99 8D   4F       02240 RSIN1    BSR     FULL
7E9B F6   FF22     02250          LDB     PIA
7E9E 56            02260          RORB
7E9F 24   02       02270          BCC     RSIN2
7EA1 AA   60       02280          ORA     0,S
7EA3 68   60       02290 RSIN2    ASL     0,S
7EA5 24   F2       02300          BCC     RSIN1
7EA7 32   61       02310          LEAS    1,S
7EA9 84   7F       02320          ANDA    #$7F
                   02330 *STORE CHARACTER IN UPPER
                   02340 *RIGHT CORNER OF SCREEN
7EAB F6   7D01     02350          LDB     CORNER
7EAE 27   03       02360          BEQ     CHKBRK
7EB0 B7   041F     02370          STA     $41F
                   02380 *CHECK FOR BREAK DISABLE
                   02390 *AND FOR BREAK SIGNAL
```

down the computer slightly, but not so much that it affects program operation. This is because the computer must check the RS-232 more than once each time it looks for a key. If it only checks the port once each time, it usually starts checking after part of the character has already been sent, so it receives the wrong character.

In this case, the computer receives the correct character about 10 percent of the time. I added a loop so the port is checked 255 times each time an INKEY$ statement is encountered. This brings the accuracy rate to about 97 percent. You will notice a bad character every once in a while, but it is not a common occurrence.

The only other difference between this routine and the ROM routine is it will not take the last key pressed by the remote user as the INKEY$ character. You may have noticed that you can press a key while the computer is printing to the screen or figuring your bank balance, and it will use that key the next time an INKEY$ statement is encountered. This is because the computer is continually checking for BREAK or SHIFT-@ to be pressed, but if you press another key it stores that value in RAM at &H87.

INKEY$ checks this location to see if a key was pressed before the INKEY$ statement was executed and, if so, it uses that value. Since checking the RS-232 every time the computer checks for a BREAK or SHIFT-@ slows down the computer, I decided to leave this out completely. It will still respond to the CoCo keyboard as before.

How to Ring the Bells and Blow the Whistle

To use *Remote2*, type Listing 1 into an assembler such as Radio Shack's *EDTASM+* and assemble it to disk or tape. If you don't have access to an assembler, type in BASIC Listing 2 and run it. It will save a machine language copy of *Remote2*. If you are using a 16K machine, just change all references to &H7D00 through &H7FFF to &H3D00 through &H3FFF.

I originated this program at &H7D00, leaving approximately 256 bytes free from &H7F00 to &H7FFF. This space is provided for another program to be loaded, such as an error-trapping routine (a good one is TRAPPERR by H. Allen Curtis from the August 1984 RAINBOW) or a software clock for a BBS. If you do not want to reserve that memory, offset the program and all of the pokes by &H100.

Once you have the program assembled, type the following commands to load and execute it:

```
CLEAR 512,&H7D00
(C)LOADM "REMOTE2"
EXEC
```

You should now see the standard OK prompt with a solid yellow cursor beneath it. Output to the screen will be much slower than normal, since everything you type or print is immediately echoed to the remote terminal. Likewise, anything typed by the remote user will appear on your screen as if you typed it.

If you have done everything correctly so far, you should be ready to set up your BBS program. It is not very difficult to write a BASIC program to operate a bulletin board. However, if this is your first attempt at doing so, use another BBS program such as *Rainbord* from the November 1983 RAINBOW as a model. [Also note the COBBS article elsewhere in this issue!]

Listing 3 is a BASIC program that simulates a BBS in order to demonstrate *Remote2*'s capabilities. It is not a full-fledged system, but it will provide a few ideas for using *Remote2* in your own BBS program.

To test the program, call a friend with a modem and a terminal program or link two computers together via a null modem cable. To make a null modem cable for two Color Computers, switch the wires on pins 2 and 4 on one end of a standard 4-pin RS-232 cable. Plug each end of the cable into a computer, load a terminal program on one and run the BBS program on the other. This is a more convenient way than testing over the phone because you can see the output on the remote terminal's screen, as well as that of the host CoCo.

I am interested in hearing from BBS SysOps who use this program for their boards. Please let me know of any problems and tell me of any ideas you have to improve *Remote2*. My address is 10952 Georgia Avenue, Kansas City, KS 66109. If you would like a reply, send me your address and a stamp. I will provide the envelope. ☐

```
                         02400 *FROM REMOTE TERMINAL
7EB3 F6     7D00         02410 CHKBRK   LDB      BREAK
7EB6 27     06           02420          BEQ      NOTBRK
7EB8 81     03           02430          CMPA     #$03
7EBA 26     02           02440          BNE      NOTBRK
7EBC 4F                  02450 ZEROA    CLRA
7EBD 39                  02460          RTS
7EBE F6     7D04         02470 NOTBRK   LDB      ICASE
                         02480 *CHECK IF CHAR SHOULD BE
                         02490 *UPPER- OR LOWERCASE AND
                         02500 *CHANGE IT ACCORDINGLY
7EC1 C1     01           02510 CKCASE   CMPB     #$01
7EC3 26     0B           02520          BNE      CMPB2
7EC5 81     61           02530          CMPA     #$61
7EC7 25     15           02540          BLO      RET2
7EC9 81     7A           02550          CMPA     #$7A
7ECB 22     11           02560          BHI      RET2
7ECD 80     20           02570          SUBA     #$20
7ECF 39                  02580          RTS
7ED0 C1     02           02590 CMPB2    CMPB     #$02
7ED2 26     0A           02600          BNE      RET2
7ED4 81     41           02610          CMPA     #$41
7ED6 25     06           02620          BLO      RET2
7ED8 81     5A           02630          CMPA     #$5A
7EDA 22     02           02640          BHI      RET2
7EDC 8B     20           02650          ADDA     #$20
7EDE 39                  02660 RET2     RTS
7EDF C6     60           02670 IRET1    LDB      #$60
7EE1 E7     9F 0088      02680          STB      [$88]
7EE5 35     95           02690 NOCHNG   PULS     B,CC,X,PC
7EE7 7E     7D75         02700 IRET2    JMP      RET
                         02710 *BAUD RATE DELAYS
7EEA 8D     00           02720 FULL     BSR      HALF
7EEC 34     02           02730 HALF     PSHS     A
7EEE 96     E6           02740          LDA      <BAUD
7EF0 21     FE           02750 HALF1    BRN      HALF1
7EF2 4A                  02760          DECA
7EF3 26     FB           02770          BNE      HALF1
7EF5 35     82           02780          PULS     PC,A
7EF7                     02790 ZZZZ     *******
            7D32         02800          END      START
00000 TOTAL ERRORS
```

210 74
520 160
END 135

Listing 2: REMOTELD

```
10 ' REMOTE2 BASIC LOADER
20 ' (C) 1985 BY SCOTT TAYLOR
30 CLS:CLEAR 512,&H7D00
40 LN=130:FOR X=&H7D00 TO &H7EF6
 STEP 8
50 PRINT@227,"READING DATA IN LI
NE"LN:READ A$:B$=RIGHT$(A$,3):A$
=LEFT$(A$,16):B=0
60 FOR Y=1 TO 8
70 A=VAL("&H"+MID$(A$,(Y*2)-1,2)
):B=B+A
80 POKE X+Y-1,A
90 NEXT Y
100 IF B<>VAL("&H"+B$) THEN PRIN
T@227," DATA ERROR IN LINE"LN:ST
OP
110 LN=LN+10:NEXT X
120 SAVEM"REMOTE2",&H7D00,&H7EF6
,&H7D32:PRINT@225,"TYPE 'EXEC &H
7D32' TO EXECUTE":END
130 DATA "0101010000009F040A6"
140 DATA "0000000000000000000"
```

```
150 DATA "0000000000000000000"
160 DATA "0000000000000000000"
170 DATA "0000000000000000000"
180 DATA "0000000000000000000"
190 DATA "000086B897E6BE0137A"
200 DATA "68AF8D012DBE016B2FC"
210 DATA "AF8D01A4867EB70139D"
220 DATA "6AB70167308D004828E"
230 DATA "BF0168308D0115BF2BA"
240 DATA "016B8EAA29318CAA334"
250 DATA "10BF0128EC81EDA13F3"
260 DATA "8CAA5126F7308D00361"
270 DATA "05313CAFA439968731B"
280 DATA "261586FFB77D09AD3AA"
290 DATA "9FA000260ABD7E8C336"
300 DATA "26057A7D0926F0812C2"
310 DATA "0310273074 7EA56B26C"
320 DATA "340 60D6F102600C71B3"
330 DATA "8108271A810D260E18C"
340 DATA "F67D02271186 0ABD2FA"
350 DATA "8E0C860D2008F67D2C8"
360 DATA "032703B67D03F67D2D6"
370 DATA "05BD7EC1BD8E0C3538D"
380 DATA "063434F60154C1BF339"
390 DATA "272C9E888108 2738261"
400 DATA "810D2767812025252 07"
410 DATA "811F220486602 0201EC"
420 DATA "813F22048B4020181E9"
430 DATA "815F220220128 17F236"
440 DATA "220E806020 0A8C061CC"
450 DATA "0026028D1835343916F"
460 DATA "A7809F88860A20EE3EC"
470 DATA "108E60610AF829F33E"
480 DATA "88860A20E8BE7D07362"
490 DATA "8C400025058C05E022B"
500 DATA "25038E0400E6882 0248"
510 DATA "E7808C05E026F69F493"
520 DATA "88C660E7808C06003A7"
530 DATA "26F939968981202533D"
540 DATA "048020 20F8C660E73C9"
550 DATA "808C6002604 8DC528E"
560 DATA "20074C812026EE9F2C7"
570 DATA "883534CC0A013935236"
580 DATA "067E7DC9B67D06A73AA"
590 DATA "9F00880F700D6F26248"
600 DATA "6E32623415AD9FA0337"
610 DATA "0027022060BD7E8C270"
620 DATA "27F32053F6FF22563FA"
630 DATA "252A8D58CC000134235"
640 DATA "048D4FF6FF225624371"
650 DATA "02AA6068602 4F23231C"
660 DATA "61847FF67D012703302"
670 DATA "B7041FF67D0027062 7A"
680 DATA "8103260 24F39F67D2A7"
690 DATA "04C101260B8161251FE"
700 DATA "15817A221180203921C"
710 DATA "C10226 0A8141250 61E0"
720 DATA "815A22028B2039C62A9"
```

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RAINBOWfest
®

If you missed our October RAINBOWfest in Princeton, N.J., or if you were there and can't wait for our next show, don't panic. The first RAINBOWfest of 1986 will be Feb. 14-16 in Palo Alto, Calif. The Hyatt Regency will again be our host and, as usual, they're offering a special room rate of $65 per night, single or double. The advance ticket deadline for Palo Alto is Feb. 7.

The second RAINBOWfest of 1986 will be May 23-25 in Chicago. Rooms at the Hyatt Regency-Woodfield are $55, single or double, and the advance ticket deadline is May 16.

Be one of the *first five people* in your state to order tickets for either RAINBOWfest, and you'll receive a free RAINBOWfest T-shirt. If your order is one of the first 500, you'll receive a free Rainbow poster.

RAINBOWfest is the only computer show specifically dedicated to the Tandy Color Computer. Nowhere else will you see as many products, have immediate access to the top experts, or be able to attend free seminars of such import. It's the next best thing to receiving the latest issue of THE RAINBOW in your mailbox!

Every RAINBOWfest features many delightful surprises because it's a great opportunity for commercial programmers to show off new and innovative products for the very first time. You get the jump on new capabilities for your CoCo. In exhibit after exhibit, there are demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

You can set your own pace between visiting the exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many of the people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer your questions, technical and otherwise. You will also meet lots of other people, just like you, who share your interest in the Color Computer. It's a person-to-person event, as well as a tremendous learning experience, in a fun and relaxed atmosphere.

To make it easier for you to participate, we schedule RAINBOWfests in three parts of the country. Since we've just met in Princeton, N.J., make plans now to join us in Palo Alto or Chicago next year. For members of the family who don't share your affinity for CoCo, you'll be glad to know that RAINBOWfest opens Friday evening. It is a daytime-only show Saturday: The CoCo Community Breakfast kicks off the festivities with a well-known speaker to keynote the highly popular affair. These traditional gatherings allow you to catch up on significant happenings in the CoCo Community in an intimate setting.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a special reservation form so you can save on your room rate.

Come to our next RAINBOWfest and help us all celebrate CoCo Community!

For more information contact our RAINBOWfest coordinator Judy Brashear, (502) 228-4492.

```
730 DATA "60E79F008835957E3B6"
740 DATA "7D758D00340296E6331"
750 DATA "21FE4A26FB3582000341"
```

```
150 ......176
320 ......132
END ......52
```

Listing 3: REM2DEMO

```
10 ' BBS DEMO PROGRAM FOR USE WI
TH REMOTE2
20 ' (C) 1985 BY SCOTT TAYLOR
30 O$(0)="off":O$(1)="on":N$="Th
e BBS":' PUT YOUR BBS NAME HERE
40 CL$="ACGH":C$(1)="Advice":C$(
2)="Chat W/Sysop":C$(3)="Goodbye
":C$(4)="Help":' COMMANDS
50 U=4:' USERS' NAMES, PASSWORDS
, AND PARAMETERS
60 A$(1)="SYSOP":P$(1)="HELLO":L
C(1)=0:LF(1)=1:BK(1)=1
70 A$(2)="BOB":P$(2)="ENTRY":LC(
2)=0:LF(2)=0:BK(2)=0
80 A$(3)="TOM":P$(3)="8IWYS6":LC
(3)=1:LF(3)=1:BK(3)=0
90 A$(4)="DAVE":P$(4)="BULLFROG"
:LC(4)=0:LF(4)=1:BK(4)=0
100 ' SET UP PARAMETERS
110 BD=&H7D00:POKE BD,1:'BREAK D
ISABLE
120 CC=&H7D01:POKE CC,1:'PUT CHA
RACTER IN CORNER OF SCREEN
130 LF=&H7D02:POKE LF,1:'SEND LF
 WITH CR
140 EC=&H7D03:POKE EC,0:'NORMAL
ECHO TO REMOTE
150 IC=&H7D04:POKE IC,1:'ALL INP
UT IN UPPERCASE
160 OC=&H7D05:POKE OC,0:'OUTPUT
IN UPPER- AND LOWERCASE
170 CU=&H7D06:POKE CU,191:'RED S
QUARE FOR CURSOR
180 SC=&H7D07:POKE SC,4:POKE SC+
1,32:'SCROLL PROTECT TOP LINE
190 I$=INKEY$:IF I$="" THEN 190:
' WAIT FOR CALLER TO PRESS KEY
200 PRINTCHR$(12);:' CLEAR REMOT
E USER'S SCREEN
210 CLS:' CLEAR COCO SCREEN
220 A$="Welcome to:":GOSUB490:A$
="-- "+N$+" --":GOSUB490
230 PRINT:PRINT"Please enter you
r user number              : ";
240 LINE INPUT UN$:UN=VAL(UN$):I
F UN>0 AND UN<=U THEN 270
250 PRINT"Invalid response.  Try
 again.":GOTO 230
260 ' ECHO * DURING PASSWORD ENT
RY (YOU WON'T SEE * ON COCO)
270 PRINT"Password: ";:POKE EC,4
2:LINE INPUT PW$:POKE EC,0
280 IF PW$<>P$(UN) THEN PRINT"So
rry, try again.":GOTO 270
290 CLS:PRINTA$(UN):' DISPLAY NA
ME IN SCROLL-PROTECTED AREA
300 PRINT"Lowercase ";O$(LC(UN))
:POKE OC,LC(UN)+1
310 PRINT"Linefeeds ";O$(LF(UN))
:POKE LF,LF(UN)
320 PRINT"Break key ";O$(BK(UN))
:POKE BD,BK(UN)
330 PRINT:A$="Command List":GOSU
B490:PRINT:T=1:FOR X=1 TO 4
340 A$=INKEY$:IF A$<>"" THEN 370
 ELSE PRINTC$(X),:NEXT
350 IF T THEN T=0:PRINT:PRINT"Yo
ur choice: ";
360 A$=INKEY$:IF A$="" THEN 360
370 I=INSTR(CL$,A$):IF I THEN PR
INTC$(I):PRINT
380 ON INSTR(CL$,A$)+1 GOTO 350,
390,400,470,480
390 A$="Advice from the Sysop":G
OSUB490:A$=CHR$(34)+"Stay out of
 the rain."+CHR$(34):GOSUB490:GO
TO330
400 PRINT"Paging Sysop, please w
ait.":PRINT
410 ' SYSOP, PRESS SPACEBAR TO E
NTER CHAT
420 FOR X=1 TO 10:PRINT"Hey Syso
p";STRING$(11-X,"!")
430 FOR Y=1 TO 10:SOUND 1,1:IF (
PEEK(&H159) AND 8)=0 THEN 450
440 NEXT Y,X:PRINT"Sorry, the Sy
sop is not here now.":GOTO 330
450 PRINT"Here is the Sysop.  Ty
pe BYE to exit.":PRINT:PRINT": H
ELLO, "A$(UN)"."
460 LINE INPUT": ";X$:IF X$="BYE
" THEN 330 ELSE 460
470 PRINT"Thanks for calling, "A
$(UN)".  Call again.":GOTO 190
480 A$="Here are the functions:"
:GOSUB490:FOR X=1 TO 4:PRINTC$(X
),:NEXT:PRINT:PRINT"Type the ini
tial letter of your selection":G
OTO330
490 L=(32-LEN(A$))/2:PRINTSTRING
$(L,32);A$:RETURN
```

RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings you will find in THE RAINBOW are formatted for a 32-character screen — so they will show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on listings indicates that the program is available through our RAINBOW ON TAPE service. An order form for this service is on the insert card bound in the magazine.

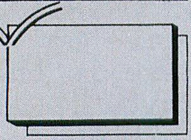
What's A CoCo

CoCo is an affectionate name which was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

The Rainbow Check Plus



The small box that you see accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS will count the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS,* type in the program and CSAVE it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down-arrow key, your CoCo will give you the checksum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure that you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine Language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so that you can operate them.

The easiest way is by using an editor/assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into your CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand assemble some programs.

Use the following program if you wish to hand assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of 'I' to &H7F80.

The Rainbow Seal

RAINBOW
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SEAL

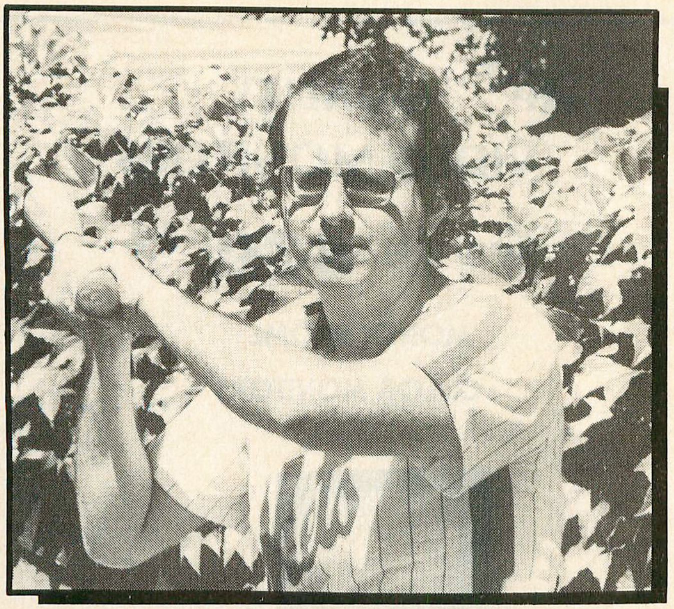
The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product which carries the Seal has been physically seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.



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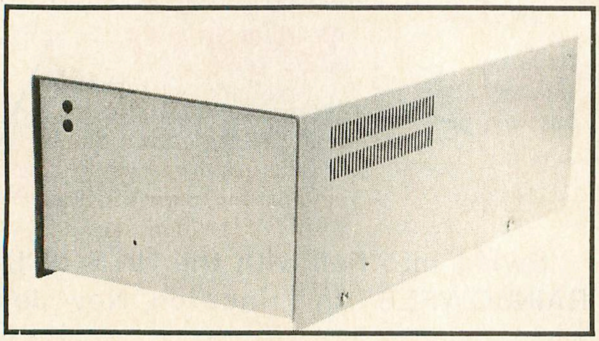

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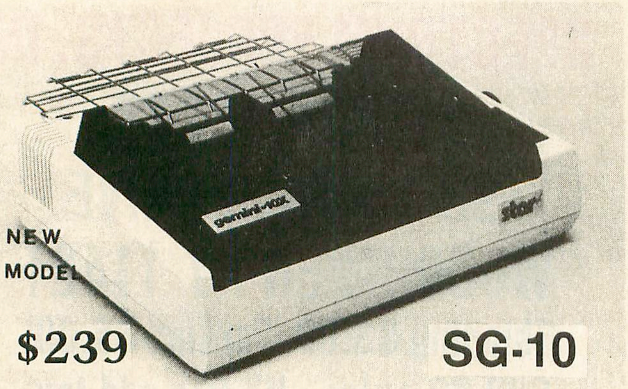

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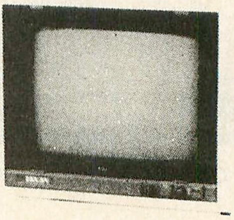

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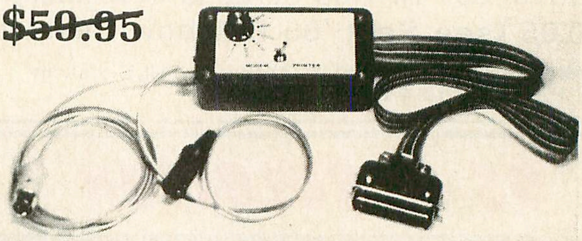

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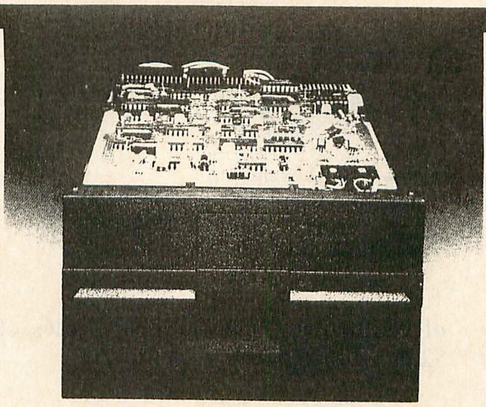

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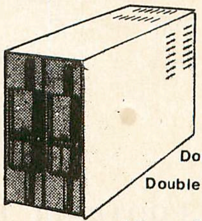

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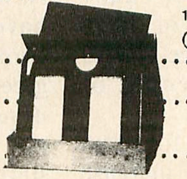

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COLLEGE FOOTBALL HANDICAPPER. *Lockmaster*, a new program from Federal Hill Software, will handicap 105 major college teams, compare the local point spread against its own computer-generated spread and rate each game as a betting proposition. The college football handicapper takes into account points scored, points allowed, schedule difficulty and home field advantage. It can also handle sudden changes in a team's personnel or coaching staff and make allowances in its predictions.

The data needed for *Lockmaster* is contained in the sports statistics section of *USA Today* and needs to be updated once a week.

Lockmaster is designed to tell the user which games are the best betting prospects. It will then rate those games with one to five stars. Five-star games are the best bets.

Federal Hill Software recently moved from downtown Baltimore to the suburbs. Their new address is: *8134 Scotts Level Road, Baltimore, MD 21208, or call (800) 245-6228.*

* * *

TANDY'S DANDY. The Tandy Corporation reported a net income per share of $2.11 based on 89,490,000 average common shares outstanding and a net income of $189,060,000 for fiscal year 1985. In fiscal 1984, Tandy had a net income per share of $2.75 based on 102,328,000 average shares outstanding and a net income of $281,871,000.

Sales and operating revenue for fiscal 1985 were $2,841,434,000, an increase of two percent over the 1984 sales of $2,775,496,000.

* * *

MODEM SECURITY. Electronics Specialists, Inc. has introduced the Kleen Line security modem for four-pin and eight-pin telephone modular connectors. The new modem is designed to suppress damaging telephone line spikes caused by lightning, spherics or telephone office switch gear by using two-stage semiconductor and gas discharge tube suppression techniques.

Write: *Electronic Specialists, Inc., 171 South Main Street, Natick, MA 01760, or call (617) 655-1532.*

* * *

BIBLE-WARE. Manna Computing Concepts has published a new software catalog that features Bible-related and general educational programs for personal computers. The educational and recreational programs are designed for churches and families. Bible study aids are available for use by ministers and Bible students.

Write: *Manna Computing Concepts, P.O. Box 527, Woodstock, GA 30188, or call (404) 928-8111.*

* * *

COMPUTERIZED STATIONERY. New stationery and matching envelopes have been issued by Compugreet, a company that markets computerized greeting cards. Compugreet produces its new stationery to fit all wide-carriage and nearly all 80-column printers. The stationery, which comes in four colors, has clean edge perforation and comes with continuous or noncontinuous envelopes.

Write: *Compugreet, P.O. Box 3357, Reston, VA 22090, or call (703) 476-0044.*

* * *

AMAZING GRACE. W. R. Grace & Co. recently purchased 39 percent interest in SoftKat, Inc., the nation's leading distributor of educational microcomputer software. SoftKat will be managed by Grace's Baker and Taylor book distribution unit. Grace has an option to purchase the balance of SoftKat's outstanding common stock in 1988.

SoftKat, which is located in Van Nuys, Calif., serves retail computer and software stores and retail suppliers of educational materials, as well as general merchandisers.

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THE DEFENDERS. Computer Power, Inc. is now offering a complete line of battery-backup power sources that protect against powerline problems that can plague users of computers and other sensitive electronic equipment. Defender power systems are designed to switch on instantly when power falters and to provide full-time power pollution clean up.

Write: *Computer Power, Inc., 124 West Main Street, High Bridge, NJ 08829, or call (201) 638-8000*

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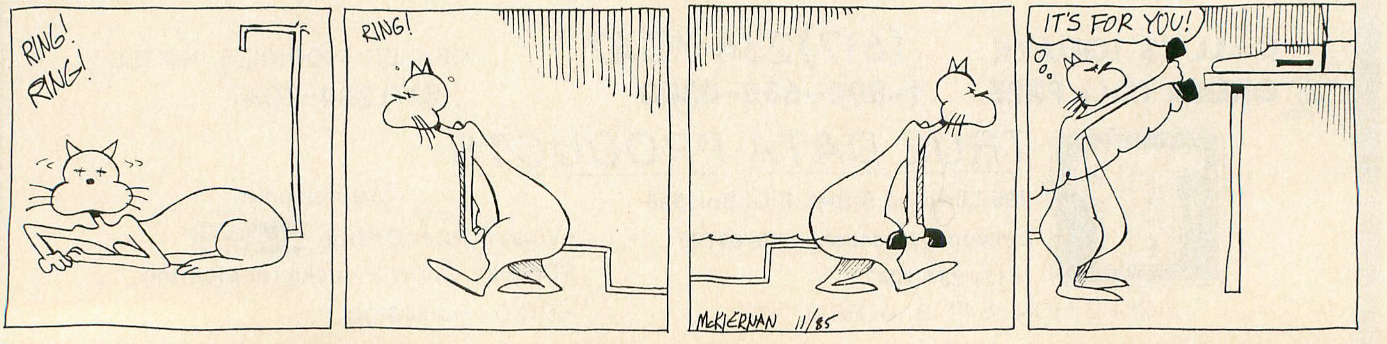
CoCo Cat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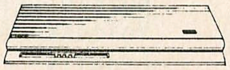

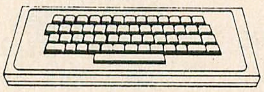

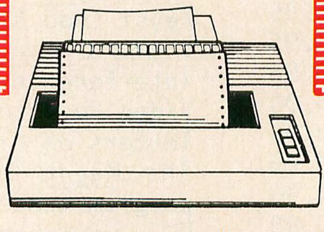

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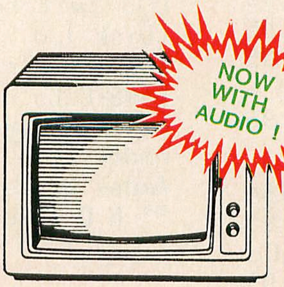

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HARDWARE PROJECT

This simple project allows you to have a computer rap session

CoCo Conversation

By Larry Landwehr

Just about everyone knows computers can communicate with each other over telephone lines — all it takes is a modem and some software commonly known as a terminal package. Did you realize that computers can also talk directly with each other over a simple wire? By modifying the cable that connects the CoCo with a printer, two CoCos can talk together.

First, you need two computers (some people have an extra one lying around because of upgrades). If you don't maybe you can do this project with a friend.

Second, you need a terminal package. I used the one written by Richard Campbell from the March 1984 issue of *The Color Computer Magazine*. It has the source code and can be modified; this is important for advanced applications. Other terminal packages, such as Radio Shack's *Videotex*, should work just fine for a demonstration, but you will need two copies of the program.

Third, you need an extra printer cable. I used Radio Shack's standard cable. The following instructions reference it specifically.

Take a look at your Color Computer operation manual. On Page 26 it shows the configuration of the RS-232 output port. Pin 1 is the carrier detect line; it is used in operating a modem (checks to see if the line is connected). We won't use it for this project. Pin 2 receives data, Pin 3 is the ground wire and Pin 4 transmits data.

Connect the RS-232 ports of two CoCos. Pin 2 of one computer must be connected to Pin 4 of the other. Pin 3 of one is connected to Pin 3 of the other. Pin 4 of one is connected to Pin 2 of the other. This hooks the receive of one to the send of the other and vice versa.

Cut the cable (the extra one you bought) in half. You will see there are four wires inside it. The yellow one goes to the two Pin 1s, green is Pin 2, red is Pin 3 and white is Pin 4.

Rewire the cable this way: Connect the reds back together again. Connect the white of one to the green of the other and the green of one to the other white. The yellow can be left hanging. I just twisted the wires together without soldering them, but be sure to use tape since shorts must be avoided.

Now plug the two ends of the new cable into the printer ports of the two CoCos. Next, load and run the terminal package on both computers at the same time. Once they are running, every time a key is pressed on one computer it will show up on the screen of the other. Data is being sent from one computer to the other.

There are some interesting applications with this experiment. Modify the terminal package to do something with the data it is receiving. You could wrap a game around it. Each player would have their own keyboard and screen and play against each other (you may wish to step up the Baud rate of your package as far as it can reliably go). Another idea might be to double your RAM space for certain application programs. Use your imagination to see what else you can dream up!

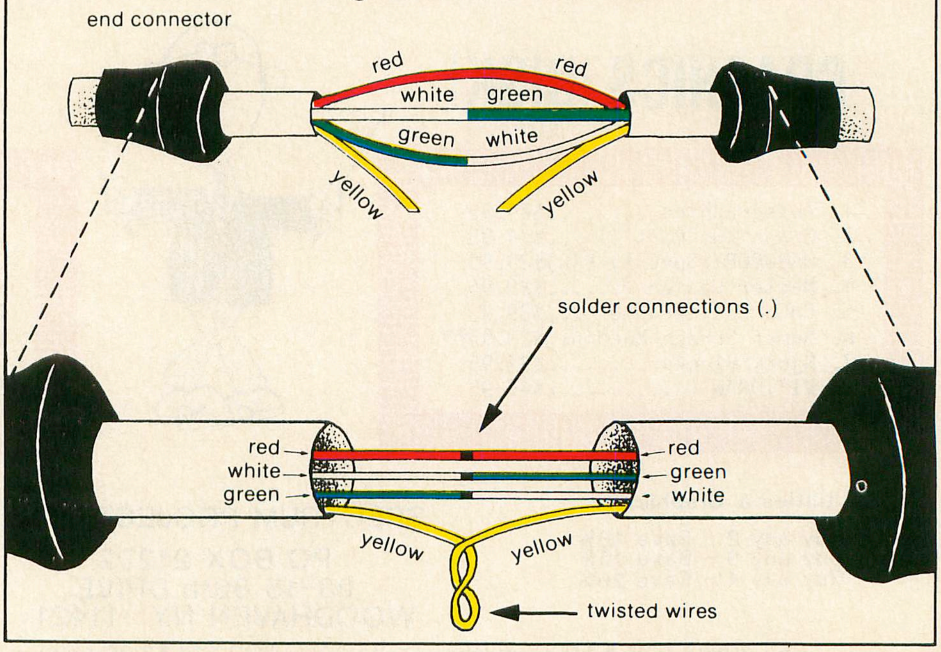

Diagram of Wire Connections

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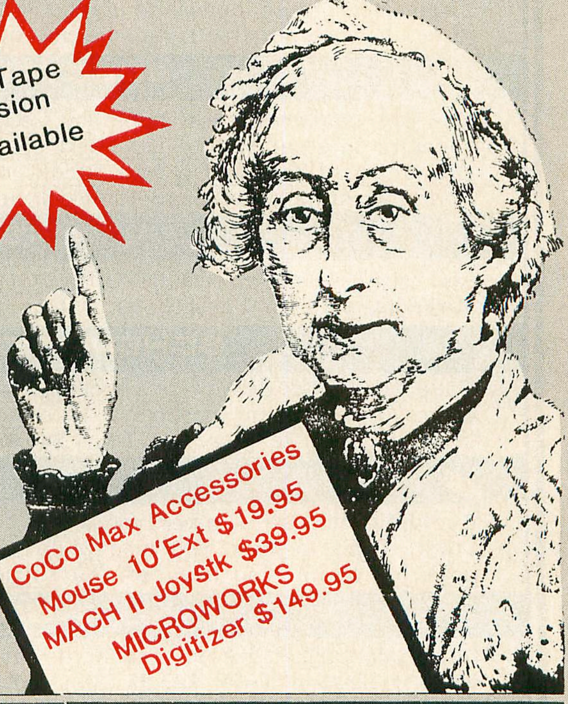

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Take advantage of an expanded 64K machine. Make an additional 8K of RAM available by relocating the Ext Basic ROM from $8000 to $D800. Copy ROMPAKS to disk (even "protected" PAKS) and create a 32K SPOOL buffer for printing. DISK **$21.95** (see July '83 Rainbow Review)

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A powerful package that transfers tape to disk and disk to tape automatically. Does an automatic copy of an entire disk of programs to tape. Ideal for Rainbow On Tape to disk. Also copies tape to tape & prints tape & disk directories. TAPE/DISK **$24.95** (see Sept '83 Rainbow Review)

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Player controls the German forces consisting of Army Groups North, Central and South, and must capture 16 Russian cities to win. In doing so he battles terrible weather conditions, attrition, Russian reserves and supply shortages.

Disk ($33.95) and Cassette ($30.95) versions are different.

PHALANX By John Galus. 32K Hi-res ML game circa Alexander the Great. Bit mapped graphics. Player controls Cavalry, Archers, Phalanxes in an attempt to out manuever and out fox the enemy. Choose Attack, Defensive, Normal or Range stance for combat on any of three battlefields. Disk ($30.95) and Cassette ($27.95) versions are different.

D-DAY THE 6th of JUNE By Phil Keller. 64K Hi-Res ML game (See Barbarossa for graphics information). Player designs order of battle consisting of Rangers, Infantry, Armor, Recon, Fighter Bombers, Airborne and Artillery. Bit mapped graphics. A host of options including air support and naval battery fire. You even get to see things explode. Disk ($33.95) and Cassette ($30.95) versions are different.

ANIZO 32K By Carl Carpenter. Game of the Italian Campaign for 1 or 2 players where Churchill's "soft underbelly of Europe" became Mark Clarke's "tough old gut". Our first simultaneous movement game. All units historically portrayed. Disk ($28.95) and Cassette ($25.95) versions are different.

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Test your basketball shooting skill, but unlike a day at the races . . .

If Your 'Horse' Comes In First, You Lose!

By Tim Jones

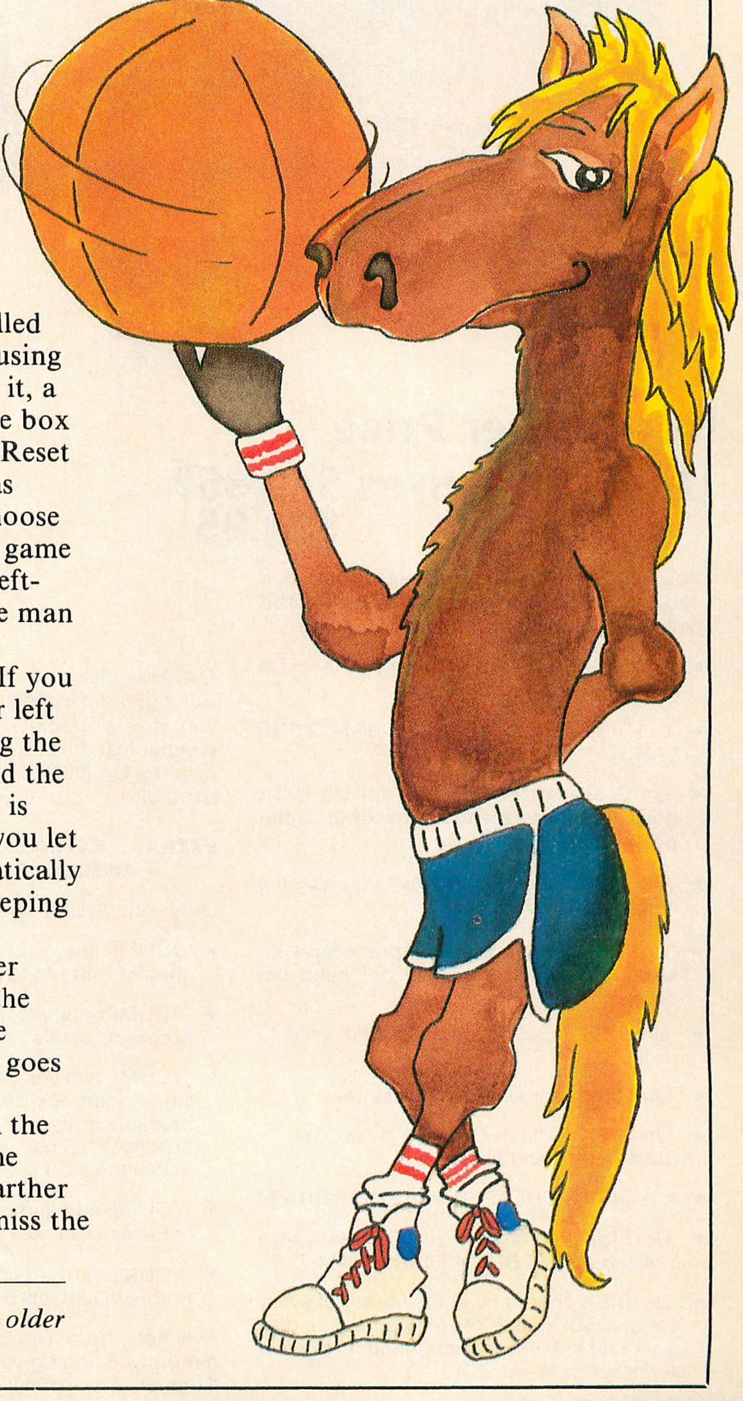
A re-creation of the popular basketball game called "Horse," this two-player game can be played using joysticks or the keyboard. When you first run it, a small box appears in the upper left-hand corner. If the box is red, just press any key. If the box is blue, press the Reset button and run the game again. After the program has finished drawing the graphics, you will be asked to choose either joystick or keyboard play. The controls for the game are pretty much the same, for example: Pressing the left-arrow key or moving the joystick to the left causes the man to move left.

The next prompt asks for beginner or expert play. If you choose beginner, there will be a rectangle in the upper left corner of the screen. This box is to aid you in guessing the correct strength of your shot. To shoot, press and hold the joystick button or the space bar until desired strength is reached; the longer you wait the higher he shoots. If you let the bar reach the top of the box, the man will automatically shoot the ball. If you choose expert play, there are beeping sounds to go by instead of the bar.

Once your shot has been released, the ball will either make it, miss or bounce off the goal. If you make it, the next player gets a chance to make the same shot. If he misses, he gets an 'H'. If he makes the shot, then play goes back to you.

Play continues in this manner until a player gets all the letters in the word "horse." Therefore, the object of the game is to make the more difficult shots by moving farther away from the goal, and hoping your opponent will miss the same shot.

(Tim Jones lives in Clinton, Louisiana, where he and his older brother make games in their spare time.)



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- Un-DISK will work even if you already own a disk but WHY BUY A DISK AT ALL?
- Un-DISK should be in the library of every serious CoCo user even if you own a disk *says Frank J. Esser, independent reviewer* for RAINBOW Magazine!

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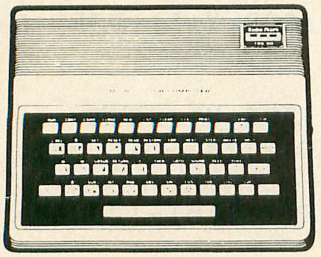
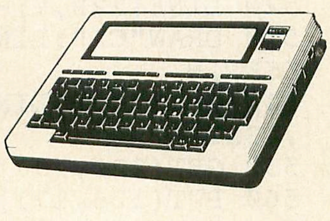
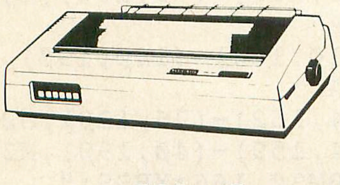
```
0 '******************************
1 '*          HORSE             *
2 '*     BY TIM J. JONES        *
3 '*       P.O. BOX 7938        *
4 '*    CLINTON, LA 70722       *
5 '******************************
10 CLEAR1000
20 PCLEAR4
30 PMODE4,1:PCLS:SCREEN1,1:FOR X
=1TO41 STEP2:LINE(X,0)-(X,40),PS
ET:NEXTX
40 A$=INKEY$:IF A$="" THEN 40
50 CLS3:O=67:PMODE3,1:PCLS:SCREE
N0,0
60 READ IN:IF IN=999 THEN 90
70 IF IN=888 THEN O=O+7:GOTO60
80 O=O+1:PRINT@O,CHR$(IN+32);:GO
TO60
90 PRINT@271,"by";
100 PRINT@396,"tim"+CHR$(175)+"j
ones";
110 FOR T=0TO31:PRINT@T,CHR$(137
+16);:NEXT
120 FOR T=31 TO 448 STEP32:PRINT
@T,CHR$(137+16);:NEXT
130 FOR T=479 TO 448 STEP-1:PRIN
T@T,CHR$(137+16);:NEXT
140 FOR T=448 TO 0 STEP-32:PRINT
@T,CHR$(137+16);:NEXT
150 PRINT@487,"COMPLETED JULY 19
84";
160 DIM A(20),B(20),M(60),M2(60)
,M3(60),GL(90),GB(90),GH(90),GT(
90),U(60),U2(60),U3(60)
170 GET(120,131)-(128,138),A,G
180 LINE(0,191)-(255,191),PSET
190 S$(1)="D8U4L6D4U8"
200 S$(2)=S$(1)+";BM+10,+0;D8R6U
8L6R6"
210 S$(3)=S$(2)+";BM+4,+0;D8U4R4
F2D2U2H2REU2HL4R4;"
220 S$(4)=S$(3)+";BM+7,+0;BD8LR4
EU2HL3HU2ER4"
230 S$(5)=S$(4)+";BM+5,+0;D8R6L6
U4R4L4U4R6"
240 P$="U6R5FDGL2BM+8,-3;D6R4BM+
4,+0U5ER2F2DL4R4D3BM+8,+0;U3L2H1
U2D2FR5EU2;BM+4,+0;R4L4D3R2L2D3R
4;BM+4,+0;U6R5FDGL2R2FD2"
250 DRAW"C3":LINE(0,0)-(255,0),P
SET
260 MS$="S4C2L3D5R2C3U4R4D3L2DR2
L2U3L3D5U5R3C4DC3D5C4L4D8R2U8R2D
8R2U8L4D9C3D5C2D2R4L2U3C3U4"
270 BS$="S4C3L3D5R2C2U4R4D3L2DR2
L2U3L3D5U5R3C4DC2D5C4L4D8R2U8R2D
8R2U8L4D9C2D5C3D2R4L2U3C2U4"
280 DRAW"BM120,166;XMS$;"
290 DRAW"BM60,166;XMS$;"
300 DRAW"BM118,175;C3D2R8UL8"
310 DRAW"BM60,176;C3M66,174U8D10
L4"
320 DRAW"BM30,166;XMS$;"
330 DRAW"BM28,176;C3M38,164R2M28
,177;"
340 GL$="S5C3U30L2D30L2U30H10UF1
2UH12UF14UH14C2U6D18U4L2C4L8"
350 DRAW"BM250,190;XGL$;"
360 FOR X=222 TO 230 STEP4
370 PSET(X,148,2)
380 NEXT X
390 Y=148
400 FOR T=1TO3
410 PSET(226,Y,2)
420 FOR X=224 TO 228 STEP4
430 PSET(X,Y+1,2)
440 NEXT X
450 Y=Y+2:NEXTT
460 DRAW"C3"
470 Y=131
480 LINE(222,Y)-(226,Y),PSET
490 Y=Y+1
500 LINE(220,Y)-(228,Y+5),PSET,B
F
510 Y=Y+6
520 LINE(222,Y)-(226,Y),PSET
530 DRAW"C2":LINE(2,14)-(16,79),
PSET,B
540 DRAW"C4":LINE(16,15)-(20,15)
,PSET
550 GET(220,131)-(228,138),B,G
560 PUT(126,171)-(134,178),B,OR
570 PUT(62,159)-(70,166),B,OR
580 PLAY"A"
590 GET(110,164)-(140,190),M,G
600 PLAY"A"
610 GET(54,152)-(76,190),M2,G
620 GET(24,159)-(40,190),M3,G
630 DRAW"BM30,166;XBS$;"
640 DRAW"BM28,176;C2M38,164R2M28
,177;"
650 PSET(32,166,3)
660 DRAW"BM120,166;XBS$;"
670 DRAW"BM60,166;XBS$;"
680 DRAW"BM118,175;C2D2R10UL10"
690 DRAW"BM60,176;C2M66,174U8HFD
10L4":PSET(122,166,3):PSET(62,16
6,3)
```

```
700 PUT(220,131)-(228,138),A,PSE
T
710 GET(110,164)-(140,190),U,G
720 GET(54,152)-(76,190),U2,G
730 GET(24,159)-(40,190),U3,G
740 GET(216,120)-(255,191),GL,G
750 PUT(222,180)-(230,187),B,PSE
T
760 GET(216,120)-(255,191),GB,G
770 PUT(222,180)-(230,187),A,PSE
T
780 PUT(222,143)-(230,150),B,OR
790 FOR X=222 TO 230 STEP4
800 PSET(X,148,2)
810 NEXT X
820 FOR T=149 TO 151 STEP2
830 PSET(224,T,2):PSET(228,T,2)
840 NEXTT
850 PSET(226,150,2)
860 GET(216,120)-(255,191),GH,G
870 PUT(216,120)-(255,191),GL,PS
ET
880 PUT(222,158)-(230,165),B,PSE
T
890 LINE(220,154)-(230,152),PRES
ET,BF
900 GET(216,120)-(255,191),GT,G
910 LINE(54,152)-(74,190),PRESET
,BF
920 LINE(24,160)-(170,190),PRESE
T,BF
930 CLS:PRINT:PRINT"(J)OYSTICK O
R (K)EYBOARD"
940 A$=INKEY$:IF A$="" THEN 940
950 IF A$="J" THEN OP=0:GOTO990
960 IF A$="K" THEN OP=2:GOTO980
970 GOTO940
980 PLAY"T255CDEFAB":PRINT"LEFT
ARROW = MOVE LEFT":PRINT"RIGHT A
RROW = MOVE RIGHT":PRINT"SPACE B
AR = SHOOT":FOR O=1TO2000:NEXTO
990 CLS:PRINT:PRINT:PRINT"      1
 BEGINNER":PRINT:PRINT"      2 EX
PERT":PRINT:PRINT"      <1 OR 2>
"
1000 A$=INKEY$:IF A$="" THEN 100
0
1010 IF A$="1" THEN BR=1
1020 IF A$="2" THEN BR=0:LINE(0,
2)-(20,80),PRESET,BF
1030 IF A$<"1" OR A$>"2" THEN 10
00
1040 PL=1:M=1:SC(1)=4:SC(2)=0:PL
AY"T255CDEFAB"
1050 LINE(20,2)-(100,60),PRESET,
BF
```







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```
1060 DRAW"BM30,10;C3;XP$;BM+10,-
6;GED6L2R4"
1070 DRAW"BM30,40;C2;XP$;BM+9,-4
;UER3FD2M-5,+3;R6"
1080 PUT(216,120)-(255,191),GL,P
SET
1090 SCREEN1,0
1100 X=110:CH=20
1110 DRAW"C3"
1120 PUT(216,120)-(255,191),GL,P
SET
1130 LINE(4,15)-(14,78),PRESET,B
F
1140 G=11:Q=80:IF PL=1 THEN PUT(
X,164)-(X+30,190),M,PSET
1150 IF PL=2 THEN PUT(X,164)-(X+
30,190),U,PSET
1160 IF OP=2 THEN 1300
1170 W=JOYSTK(0):E=JOYSTK(2)
1180 IF M=0 THEN 1250
1190 IF PL=2 THEN 1230
1200 IF W=<10 THEN X=X-2:CH=CH+1
1210 IF W=>50 THEN X=X+2:CH=CH-1
1220 GOTO1250
1230 IF E=<10 THEN X=X-2:CH=CH+1
1240 IF E=>50 THEN X=X+2:CH=CH-1
1250 PK=PEEK(65280)
1260 IF PK=124 OR PK=252 THEN 12
50
1270 IF PL=1 AND PK=126 OR PL=1
AND PK=254 THEN 1360
1280 IF PL=2 AND PK=125 OR PL=2
AND PK=353 THEN 1360
1290 GOTO 1330
1300 IF PEEK(343)=247 AND M=1 TH
EN X=X-2:CH=CH+1
1310 IF PEEK(344)=247 AND M=1 TH
EN X=X+2
1320 IF PEEK(345)=247 THEN 1360
1330 IF X=>190 THEN X=190
1340 IF X=<46 THEN X=46
1350 GOTO1140
1360 PLAY"T255FFFFP1FFFFFP1FFFF
FP1AAAAA":SP=X
1370 IF OP=2 THEN 1430
1380 PK=PEEK(65280)
1390 IF PK=124 OR PK=252 THEN 13
80
1400 IF PL=1 AND PK=126 OR PL=1
AND PK=254 THEN 1440
1410 IF PL=2 AND PK=125 OR PL=2
AND PK=253 THEN 1440
1420 GOTO1470
1430 IF PEEK(345)=247 THEN 1440
ELSE 1470
1440 G=G+1:Q=Q-2:IF BR=1 THEN LI
NE(4,Q)-(14,Q-1),PSET,B ELSE PLA
Y"T255CF"
1450 IF G=43 THEN 1470
1460 GOTO 1370
1470 X=X+14:Y=154:G=-G:ST=G
1480 IF PL=2 THEN 1520
1490 PUT(X-10,152)-(X+12,190),M2
,PSET
1500 PUT(X-10,159)-(X+6,190),M3,
PSET
1510 GOTO 1540
1520 PUT(X-10,152)-(X+12,190),U2
,PSET
1530 PUT(X-10,159)-(X+6,190),U3,
PSET
1540 X=X-2
1550 IF X+12=>244 THEN 1640
1560 G=G+6:X=X+12:Y=Y+G
1570 IF Y=>218 THEN 1640
1580 PUT(X,Y)-(X+8,Y+7),B,OR
1590 PUT(X-12,Y-G)-(X-4,Y+7-G),A
,PSET
1600 IF X=>216 AND X=<230 AND Y=
<148 AND Y=>130 THEN 1630
1610 IF G=>-ST+6 THEN 1640
1620 GOTO 1550
1630 GOTO 1720
1640 PLAY"T255AAAAP1FFFFF":LINE
(0,156)-(240,190),PRESET,BF
1650 LINE(230,1)-(255,120),PRESE
T,BF
```

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```
1660 DRAW"C4":LINE(0,191)-(255,1
91),PSET
1670 IF M=0 THEN SC(PL)=SC(PL)+1
1680 M=1:PL=PL+1:IF PL=3 THEN PL
=1
1690 DRAW"BM36,16;XS$(SC(1));BM3
6,46;XS$(SC(2));"
1700 IF SC(1)=5OR SC(2)=5THEN 18
40
1710 GOTO 1090
1720 IF RND(100)=<CH THEN 1890
1730 PUT(216,120)-(255,191),GH,P
SET
1740 PUT(216,120)-(255,191),GT,P
SET
1750 PUT(216,120)-(255,191),GB,P
SET
1760 PLAY"T255AABBCCAAFFAACCCC"
1770 LINE(0,156)-(240,190),PRESE
T,BF
1780 PL=PL+1:IF PL=3 THEN PL=1
1790 IF M=0 THEN M=1:X=110:CH=20
:GOTO1820
1800 IF M=1 THEN M=0
1810 X=SP
1820 LINE(4,15)-(14,78),PRESET,B
F
1830 GOTO1110
1840 PLAY"T4O3L4EL4.EL8EL4D#EFL4
.FL8EL2FL4FL4.FL8FL4EFGL4.GL8F#L
2GL4AO4CO3BAGECDEGL8FL4EDL1C"
1850 FOR O=1TO1500:NEXTO
1860 CLS:PRINT:PRINT"PRESS <ENTE
R> TO PLAY AGAIN":PLAY"T25P8"
1870 A$=INKEY$:IF A$<>CHR$(13) T
HEN 1870
1880 GOTO1040
1890 PUT(216,120)-(255,191),GL,P
SET
1900 PUT(222,139)-(230,146),B,PS
ET
1910 PUT(222,139)-(230,146),A,PS
ET
1920 PUT(216,139)-(224,146),B,PS
ET
1930 FOR O=1TO60:NEXTO
1940 PUT(216,139)-(224,146),A,PS
ET
1950 PUT(210,142)-(218,149),B,PS
ET
1960 FOR O=1TO30:NEXTO
1970 PUT(210,142)-(218,149),A,PS
ET
1980 PUT(208,160)-(216,167),B,PS
ET
1990 FOR O=1TO60:NEXTO
2000 PUT(208,160)-(216,167),A,PS
ET
2010 PUT(208,182)-(216,190),B,PS
ET
2020 FOR O=1TO30:NEXTO
2030 GOTO 1640
2040 DATA 133,143,143,138,143,13
7,131,131,134,143,129,131,131,13
4,143,137,131,131,134,143,129,13
1,131,131,888
2050 DATA 143,132,140,140,136,14
3,133,143,143,138,143,132,140,14
0,137,143,134,140,140,141,143,13
2,140,140,143,888
2060 DATA 143,133,143,143,138,14
3,133,143,143,138,143,133,143,13
0,141,143,141,143,143,138,143,13
3,143,143,143,888
2070 DATA 143,135,143,143,139,14
3,139,131,131,135,143,135,143,14
3,131,143,139,131,131,135,143,13
1,131,131,131
2080 DATA 999
```

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CoBBS:

An Introduction To The System And Its Special Features

By Richard Duncan

In this four-part series, you will learn about a BBS program that gives the SysOp complete control over the operation

Over several years there have been many bulletin boards written for the CoCo, from the simple to the very involved. As the complexity of the system increased, so did the price of the software. The desire to operate a bulletin board starts with most users during their first connection with a modem.

CoBBS, the Color Bulletin Board System, was started by the need to have a BBS that gives the SysOp (the system operator) more power in handling his operation and more users than many other systems, both commercial and public domain. CoBBS has been online and running for over a year and is about to top its 10,000th caller. In this first of a four-part series, we will take an overview of the system and provide the listing for the main program.

CoBBS (the program) supports up to 255 different menus, with up to 21 commands in each menu. The *Error Trapping* (Andy Kluck) and *Clock* (A. Trevor) programs used with the system come from CompuServe. *CoBBS* handles many different read/write message requirements, system controls and ASCII uploading and downloading. It was written on the original CoCo, but the CoCo 2 has been used by other SysOps and there are provisions within the program for the CoCo 2.

Hardware requirements are a 64K Color Computer with at least one drive, Multi-pak, RS-232 Pak and an auto-answer modem. To be able to take full advantage of the software, you need the RS-232 Pak. I started out using the serial port but quickly abandoned it after seeing how much power the RS-232 Pak added to the system. I strongly urge the use of an RS-232 Pak, but for those who would rather use the serial port, we will provide a modification for the RS-232 driver and show how to change CoBBS to operate with it in Part Four of this series.

The system has one bug that I have not been able to figure out. *CoBBS* must be operated in the 64K mode or it may crash. In this mode a few bytes of the first section of BASIC at memory location $8000 are written over, but it does not affect the system's operation.

User access, or the prevention of it, is always a concern. Some of the simpler systems do not have the capability to handle different types of callers. *CoBBS* is set up with each user having a privilege level and 16 "flags" in his user log file. Each menu and command on that menu also has a privilege level and 16 flags. For a user to see a menu or any command within the menu, he must meet or exceed the privilege level required. If the menu or command has a flag "set" (a one instead of a zero), the user must also have that flag "set" to be able to see and use it.

(Richard Duncan is a broadcast technician for WMC-TV in Memphis, Tenn. His first CoCo was one of the units introduced to the dealers in Dallas. He is active in amateur radio (WB5CNV) and especially interested in Packet communications. Richard lives in West Memphis, Ark.)

For example, a menu is set up with the following access requirements:

Priv=30 F1=00000000 F2=00000000

Before a user can access that menu he must have a privilege of 30 or higher. Since no flags are set, none are required in the user's flags. If the access requirement is:

Priv=30 F1=00000001 F2=00000000

a user would not only have to be given a privilege of 30 to see the menu, but he must also have the eighth flag (the last flag of group F1) set or he will not be allowed on that menu. The same is true of each command and each menu.

Each menu may have up to 21 commands. Each individual command is specified by the system operator. Without considering the various types at this time, let's look at Table 1 to see how each user is affected.

Table 1

Command	Priv	F1	F2
Read messages	25	00000000	00000000
Leave messages	30	00000000	00000000
Access user log	30	10000000	00000000
Access tracer	30	00000000	10000000
Terminate	0	00000000	00000000

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Users who have access to this menu will see the header, menu number and name. But from there on, each of the following sees something different on the *same* menu.

User #1 Priv=20 P1=00000000 P2=00000000

This user only sees the terminate function. His privilege is too low for the system to allow access to any of the other commands.

User #2 Priv=25 P1=10000000 P2=00000000

User #2 may read messages since he meets that command's requirements. He may also terminate, but that is the only command he will see. Even though he has the first flag of P1 (the user's flags) set, he still cannot leave, or access the user log and the tracer routine because he does not have the required privilege.

User #3 Priv=30 P1=00000000 P2=10000000

User #3 may read and leave messages. He may also access the tracer routine since his first P2 flag is set. He may *not* access the user log since he does not have the first P1 flag set. Of course, he may also terminate.

User #4 Priv=40 P1=11111111 P2=11111111

This user has access to everything because all levels of access meet and/or exceed those required.

This type of operation allows the system operator to have control over the system by each individual calling, and can actually be set up so a menu is different to each caller.

When a menu is loading, it first checks to see if the user is allowed access to that menu, then it loads in all the command types for the menu. It checks the privilege and flag requirement for each command and compares it to the user to determine his access.

If accessible, the system keeps the command in memory. It retains the text for that command, the key required to initiate it and the *type* of command that is designated by ASCII character. This character is called the command type and is used by the system to determine what you want to do when the user hits the corresponding key. Table 2 lists the different command types.

Menus are added or changed using a Menu File Editor (a file called *SMF/EDI*). The menu displayed on the screen to the user is in the system in *memory* and not written as BASIC lines, which leads to greater flexibility and ease in changing various menus and commands. You do not have to modify the program to change, add or delete a command on any menu.

Table 2 lists the different commands available to the SysOp for menus. A command is referred to as a *type*, which is an ASCII character '!' through 'Z'. The *data* referred to is required by some types to complete their task. A type 'W' with a '3' in data allows the user to read all public messages on any menu number from '3' down and any private message if it is either to or from him.

The command types can be grouped into 11 categories. Remember that the type is specified by the SysOp with the file *MENU/SYS*, which contains all the information. Each command within the file contains the text for that command, which keystroke (input) to accept for the command, the privilege level, 16 flags, type of command and data (which may not be required for some types).

CoBBS consists of eight main programs. While online, only two files, *USER/SYS* and *COBBS/SYS*, are needed for normal operations. Other files include *STARTUP/BAS* and *COTERM/BIN*, which are used while booting the system, three editor programs (*SCF/EDI, SUL/EDI* and *SCF/EDI*) and a message base purger (*SMP/EDI*). All files are needed to operate *CoBBS*, but we will be able to boot the program and play with it after Part Two next month.

The listing for the main program, *COBBS/SYS*, is included here. The system is set up in a series of subroutines that are accessed by the menu routine (lines 1000-1167). The menu routine determines the commands that are active, based on the user's privilege and flags. Hooks are used just as BASIC has hooks in memory.

A quick way to check a type's routine is to take the ASCII value of that letter. The ASCII value of 'R' for the standard read type is 82. Line 82 contains the pointer to the subroutine that handles the read function. Some hook lines set up data values before jumping to the proper subroutine.

The system includes a tracer routine so you know what each user did while online. The output of the tracer information can be to tape, disk or printer. The routine starting at Line 9600 is the tracer save routine.

A continual check for carrier detect is made while a user is on the system. If a carrier is lost, the system will reboot and be read for another call in a few seconds. Errors are trapped, and if not, a normal part of the operation is reported on the screen and sent to the tracer file. If the system cannot recover from the error it will shut down until you can determine the problem.

The system has a "blunderbuss" type of protection, if desired. If the system is protected, it will lock up unless the protection is removed before entering BASIC. Hackers cannot have access to your valuable files by causing the system to enter BASIC, if it ever does.

There are several *CoBBSs* operating around the country now. If you would like to check one out, my BBS number is (501) 735-5614 and is online 24 hours a day. If you have any questions about the system, please call my board and leave a message, or page me and if I'm available I can go voice on that line to talk with you.

Next month, we will discuss the various commands available and how they operate along with the rest of the files that make up the main operating system. ☐

Table 2

Command Types

Type	Name	Data
!	LOAD "SMF/EDI",R	
"	Reserved	
#	LOAD "SUL/EDI",R	
$	LOAD "SCF/EDI",R	
%	Reserved	
&	Reserved	
'	Print messages	0 or 1
(	LOAD "LOOKTRAC/BAS",R	
)	LOAD "LOOKREG/BAS",R	
*	Time on system	
+	SysOp option	
,	SysOp option	
-	SysOp option	
.	SysOp option	
/	SysOp option	
0	List HELP file	BNAME
1	List INFO file	BNAME
2	List TEXT file	BNAME
3	List BULL file	BNAME
4	Reserved	
5	Reserved	
6	Reserved	
7	Scan, 1 menu, all messages	Menu #
8	Scan, menu down, private TO/FROM	Menu #
9	Scan, menu down, all messages	Menu #
:	Reserved	
;	Reserved	
<	Reserved	
=	Reserved	
>	Reserved	
?	Reserved	
@	Menu control editor	
A	Abort out of menu	0,1,2
B	Reserved	
C	Chat. Page system	
D	Download a file	BNAME
E	Exit and run program	program name
F	Load and run file specified	
G	Goto menu #	Menu #
H	Reserved	
I	Reserved	
J	Reserved	
K	Kill messages	
L	Leave messages (stand.)	Menu #, (P)
M	Read E-mail (private)	Menu #
N	Leave E-mail (private)	Menu #
O	List user log	
P	Password enter/change	
Q	Quit, Exit to BASIC	0,1
R	Read messages, standard	Menu #
S	Scan messages, standard	Menu #
T	Terminate	0,1
U	Upload an ASCII file	0,1,2,3,4
V	Read, 1 menu, all messages	Menu #
W	Read, menu down, TO/FROM	Menu #
X	Read, menu down, all	Menu #
Y	Leave SysOp messages	
Z	Restart logon	

31	160	1109	39	2095	115
55	181	1140	245	2180	205
78	66	1181	11	2285	87
104	62	1217	85	2374	81
120	132	1250	72	2408	158
303	220	1330	65	2456	61
327	1	1390	64	7035	13
425	113	1450	115	7130	85
604	235	1490	33	9220	203
732	192	1560	29	9620	85
855	80	1610	147	END	155
945	38	1680	164		
1065	214	2020	144		

The listing: COBBSSYS

```
0 '-COBBS (COBBS/SYS) COPYRIGHT
<C>1984 BY RICHARD DUNCAN
9 RUN T 30:PRINT
10 CLEAR3500:DIM BC$(21),L$(80),
TY$(21),TX$(21),D$(21),KY$(21):N
U$=CHR$(0):DR$(0)="0":DR$(1)="1"
:DR$(2)="2":DR$(3)="3"
11 DEFUSR0=&H0ED0:DEFUSR1=&H0ED3
:DEFUSR2=&H0E81:RUNT30:GOSUB9500
:GOSUB25:GOTO1000
25 REM
26 IFPEEK(4658)=0THEN28 ELSE CD=
PEEK(65385):CD=CD AND 32:IF CD<>
0 OR PEEK(4657)<>0 THEN 27 ELSE2
8
27 CLOSE:FORT=1TO100:NEXTT:TR$=T
R$+"LOSS OF CARRIER":GOSUB9615:L
OAD"USER/SYS",R
28 II$=INKEY$:IFII$=""THEN29ELSE
CH$=II$:K=INSTR("^_ ]",II$):IFK=
0THEN29ELSE ON K GOSUB800,31,713
0,9800
29 RETURN
30 PRINT:PRINT"UNABLE TO ACCESS
PROPERLY.":PRINT"PLEASE CALL BAC
K LATER....":POKE65386,106:LOAD"
USER/SYS",R
31 IFPEEK(4684)<>188THENPOKE&HAC
7D,&HA3:POKE&HAC7E,&H90:GOSUB860
:GOSUB880:ENDELSEGOSUB860:GOSUB8
80:FORX=&H112B TO &H1136:POKE X,
&H12:NEXTX:END
33 LOAD" SMF/EDI",R
34 RETURN
35 LOAD" SUL/EDI",R
36 RETURN
37 RETURN
38 RETURN
39 PRINT:PRINT:D=VAL(D$):IFD=0TH
ENPRINT"FILE NOT AVAILABLE AT TH
IS TIME.":RETURN ELSEIF D=1 THEN
PRINT"SORRY, YOU ARE NOT AUTHORI
ZED.":RETURN
40 LOAD"LOOKTRAC",R
41 LOAD"LOOKREG",R
42 PRINT:PRINT:PRINT:F3=1:GOSUB7
10:F3=0:RETURN
43 RETURN
44 RETURN
45 RETURN
46 RETURN
47 RETURN
48 X$="HELP":GOTO7000
49 X$="INFO":GOTO7000
50 X$="TEXT":GOTO7000
51 X$="BULL":GOTO7000
52 RETURN
53 RETURN
54 RETURN
55 BQ=VAL(D$):F6=1:G0=1:GOTO2000
56 F6=1:GOTO87
57 F6=1:GOTO88
58 X$="":GOTO7000
59 RETURN
60 RETURN
61 RETURN
62 RETURN
63 RETURN
64 GOTO300
65 X=VAL(D$):GOTO200
66 RETURN
```

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```
67 GOTO7100
68 B=VAL(LEFT$(D$,1)):TD=B:IFB<3
THEN D$=RIGHT$(D$,4):GOTO1200 EL
SE ZK=INSTR(D$,"P"):ZD=VAL(MID$(
D$,2,1)):GOTO1200
69 GOTO550
70 RUNT1110:PRINT:PRINT"RUN FILE
: ";:GOSUB675:IFCH$=""THENRETURN
 ELSE LOAD CH$,R
71 B0=BC:BC=VAL(D$):RETURN
72 RETURN
73 RETURN
74 RETURN
75 GOTO1900
76 ZK=INSTR(D$,"K"):PF=INSTR(D$,
"P"):BL=VAL(D$):GOTO1400
77 ML=1:BQ=VAL(D$):F6=0:GOTO2000
78 ZK=INSTR(D$,"K"):PF=INSTR(D$,
"P"):ML=1:BL=VAL(D$):F6=0:GOTO14
00
79 GOTO900
80 GOTO400
81 IFVAL(D$)=0THEN31ELSE750
82 BQ=VAL(D$):F6=0:GOTO2000
83 BQ=VAL(D$):F6=1:GOTO2000
84 IFVAL(D$)=0THEN9800ELSEPRINT:
PRINT"WOULD YOU LIKE TO LEAVE":P
RINT"THE SYSTEM OPERATOR A MESSA
GE? ";:GOSUB625:IFCH$="Y"THENPRI
NT"YES":GOSUB95:GOTO9800 ELSEPRI
NT"NO":GOTO9800
85 TU=VAL(LEFT$(D$,1)):TD=VAL(MI
D$(D$,2,1)):GOTO1300
86 MQ=1:BQ=VAL(D$):G0=1:F6=0:GOT
O2000
87 BQ=VAL(D$):G0=2:GOTO2000
88 BQ=VAL(D$):G0=3:GOTO2000
89 GOSUB95:RETURN
90 TR$=TR$+CHR$(13)+"RESTART LOG
 ON":GOSUB9615:LOAD"USER/SYS",R
95 MF$=NA$:MT$="SYSOP":MS$="SYSO
P MSG":BL=255:ML=2:GOSUB1445:RET
URN
100 REM
101 DC=VAL(HEX$(PEEK(&H0EFD))):H
R=VAL(HEX$(PEEK(&H0EFE))):MN=VAL
(HEX$(PEEK(&H0EFF))):SS=VAL(HEX$
(PEEK(&H0F00))):HR$=RIGHT$(STR$(
HR),2):IFHR<10THEN MID$(HR$,1,1)
="0"
104 MN$=RIGHT$(STR$(MN),2):IFMN<
10THEN MID$(MN$,1,1)="0"
105 TI$=HR$+":"+MN$:IF SS<54ORMN
>58 THEN 108
106 MN=MN+1:IF MN>59 THEN MN=0:H
R=HR+1:IF HR>23 THEN HR=0
107 X=USR1(HR*256+MN)
108 X=PEEK(4611):IF X<>DC THEN 1
11
```

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```
109 DA$=RIGHT$(STR$(PEEK(4608)),
2)+"/"+RIGHT$(STR$(PEEK(4609)),2
)+"/"+RIGHT$(STR$(PEEK(4610)),2)
110 GOTO118
111 MM=PEEK(4608):DA=PEEK(4609):
YY=PEEK(4610):DA=DA+1:IFDA>31THE
N DA=1:MM=MM+1:IF MM>12 THEN MM=
1:YY=YY+1
112 POKE4608,MM:POKE4609,DA:POKE
4610,YY:POKE4611,DC:GOTO109
118 AX=PEEK(4615)*60+PEEK(4616):
PT=HR*60+MN:IFF3=1THEN124ELSEUO=
PEEK(4619):IF PT-AX<(UO*5)-5 OR
UO=255 THEN 121
119 T0=PEEK(4619)*5:T1=T0-(PT-AX
):IFT1<1THEN T1=0:GOTO120 ELSE P
RINT"YOU ONLY HAVE";T1;"MINUTES
LEFT!":GOTO121
120 PRINT"YOU HAVE NO TIME LEFT!
":TR$=TR$+"TIMED OUT "+TI$:GOSUB
9615:GOTO9820
121 '
124 RETURN
150 REM
152 F=ASC(F$):E=128:F$=""
154 FOR Q=1 TO 8
156 J=INT(F/E)
158 IF J=0 THEN F$=F$+"0"ELSEF$=
F$+"1"
160 F=F-(E*J):E=E/2
162 NEXT Q
166 RETURN
175 REM
177 E=1:F=0
179 FOR Q=8 TO 1 STEP -1
181 IFMID$(F$,Q,1)="1"THEN F=F+E
183 E=E*2:NEXTQ:F$=CHR$(F)
185 RETURN
200 REM
205 '
210 '
215 ON X+1 GOTO 220,230,240
220 BC=B0
225 RETURN
230 BC=PEEK(4618)
235 RETURN
240 BC=0
245 RETURN
300 REM
303 BX=1:M=0:B=PEEK(4618):P9=0
306 CLS:PRINT:PRINT:PRINT"     MEN
U CONTROL EDITOR":PRINT:GOSUB339
309 PRINT"PRESENT LOG-ON MENU:";
B:PRINT:PRINT"<?> FOR LIST, OR":
PRINT"NUMBER TO LOG ON: ";:GOSUB
650
312 IFCH$="?"THEN303ELSE BE=VAL(
CH$):IF BE<0 OR BE>255 THEN 309
ELSE FOR X=1 TO LEN(BA$):IF BE=A
```

```
SC(MID$(BA$,X,1)) THEN 315 ELSE
NEXT X:GOSUB369:GOTO309
315 CLS:PRINT:PRINT:PRINT"  MENU
 PROMPTING":PRINT"  1 - FULL TEX
T PROMPT":PRINT"  2 - ABBREVIATE
D PROMPT":PRINT"  3 - KEY PROMPT
":PRINT"  4 - COMMAND ONLY":PRIN
T"ENTER PROMPT: ";:GOSUB600:P=VA
L(CH$):IF P>4ORP<1 THEN 315ELSEP
RINTCH$
318 PRINT:PRINT"WAIT...";
321 CLOSE:GOSUB9200:GET#1,1:LSET
 UE$=CHR$(BE):POKE4618,BE
324 LSET UL$=CHR$(P):POKE4628,P:
UL=P:UX=P
326 PUT#1,1:X$=UN$+UP$:K7=PEEK(4
690)*256+PEEK(4691):IFK7>LOF(1)O
RK7=0THENK7=2
327 GET#1,K7:Y$=UN$+UP$:IFX$=Y$T
HEN R=K7:GOTO330ELSEFOR R=2 TO K
1:GET#1,R:IF UN$+UP$=X$ THEN 330
 ELSE NEXT R:PRINT:PRINT"UNABLE
TO PROPERLY ACCESS.":PRINT"PLEAS
E TRY LATER.":CLOSE:RETURN
330 LSET UE$=CHR$(BE):LSET UL$=C
HR$(P):PUT#1,R:CLOSE:PRINT:RETUR
N
339 CLOSE:GOSUB9400:BA$=""
342 FOR RM=1 TO K1 STEP 4
345 GET#1,RM:PB=ASC(M2$):PO=ASC(
M7$):IFP9=1ANDPO=0THEN372
348 GOSUB825:ON BX GOTO 357,366
357 IF PR<PB OR K7=1 THEN 372
360 PRINTTAB(3)ASC(M1$);TAB(10)M
5$:BA$=BA$+M1$
363 GOTO372
366 IF ASC(M1$)<>BE THEN 372 ELS
E IF PR=>PB AND K7=0 THEN 375
369 M=1:PRINT"YOU ARE NOT AUTHOR
IZED FOR THAT MENU.":GOTO 375
372 NEXT RM:IF BX=2 THEN 369
375 CLOSE:RETURN
400 REM
405 RUNT1170
410 C=0:EXEC&H10DA
415 PRINT:PRINT"Please wait. Acc
essing userlog."
420 CLOSE:GOSUB9200:GET#1,1:TT$=
UN$+UP$:K7=PEEK(4690)*256+PEEK(4
691):IFK7=0ORK7>K1 THEN425ELSE G
ET#1,K7:IFTT$=UN$+UP$ THEN A=K7:
GOTO440
425 FOR A=2 TO K1
430 GET#1,A:IF TT$=UN$+UP$THEN44
0
435 NEXTA:CLOSE:PRINT"UNABLE TO
ACCESS PROPERLY.":RETURN
440 PRINT"PRESENT PASSWORD: ";UP
$:EXEC4314
445 PRINT"ENTER NEW PASSWORD: ";
:GOSUB650
450 IFCH$=""THEN460ELSEIFLEN(CH$
)>8THENPRINT"TOO LONG. MAXIMUM O
F 8 CHARACTERS.":GOTO445
455 CH$=LEFT$(CH$+STRING$(8,0),8
):LSET UP$=CH$:PUT#1,A:GET#1,1:L
SET UP$=CH$:PUT#1,1
460 CLOSE:RETURN
480 CLOSE:RETURN
500 REM
505 K7=0
510 FOR Q=1 TO 8
515 IFMID$(F$,Q,1)="0"THEN525
520 IFMID$(PX$,Q,1)<>"1"THEN K7=
1:RETURN
525 NEXTQ:RETURN
550 REM
555 RUN T 1170
560 LOAD D$,R
600 REM
604 GOSUB25:RUNT1170
605 EXEC&H10DA:CH$=CHR$(PEEK(448
1)):IC$=INKEY$:IFIC$<>""THEN CH$
=IC$:GOTO615
610 IFCH$=CHR$(0)THEN605
615 RETURN
625 GOSUB604:CH=ASC(CH$)
630 IFCH>96ANDCH<123THEN CH=CH-3
```

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```
2
635 CH$=CHR$(CH):RETURN
650 REM
655 GOSUB25:RUNT1170:LINEINPUTCH$:GOSUB25:RETURN
675 GOSUB655:G1$="":IFCH$=""THEN RETURN
680 FOR G=1 TO LEN(CH$)
685 G1=ASC(MID$(CH$,G,1)):IFG1>96ANDG1<123THEN G1=G1-32
690 G1$=G1$+CHR$(G1):NEXTG:CH$=G1$:RETURN
700 REM
705 F3=0
710 GOSUB100:PT=(HR*60)+MN:LT=(PEEK(4615)*60)+PEEK(4616):IF PT<LT THEN PT=PT+1440
725 AX=PT-LT:HT=INT(AX/60)
730 MT=AX-(HT*60):PRINT"    START TIME:";STR$(ASC(CHR$(PEEK(4615))));":";:A$=RIGHT$(STR$(ASC(CHR$(PEEK(4616)))),2):IFVAL(A$)>9THENPRINTA$ELSEMID$(A$,1,1)="0":PRINTA$
732 PRINT"          TIME:";STR$(HR);":";:A$=RIGHT$(STR$(MN),2):IFVAL(A$)>9THENPRINTA$ELSEMID$(A$,1,1)="0":PRINTA$
735 PRINT:PRINT"TIME ON SYSTEM:";STR$(HT);":";:A$=RIGHT$(STR$(MT),2):IFVAL(A$)>9THENPRINTA$ELSEMID$(A$,1,1)="0":PRINTA$
736 '
745 RETURN
750 REM
755 PRINT:PRINT:PRINT"EXITING TO DOS...":PRINT"PASS: ";:GOSUB650:IFCH$=RIGHT$(D$,4)THEN TR$=TR$+"+++EXIT TO BASIC+++":GOSUB9615:GOTO31
780 PRINT:TR$=TR$+"**EXIT DENIED**":GOSUB9615:PRINT:RETURN
800 REM
805 GOSUB870:PRINT:PRINT">>>";NA$;"<<<":GOSUB880
820 RETURN
825 REM
830 F$=M3$:GOSUB150:F1$=F$:PX$=P1$:GOSUB500:IFK7=1THEN840
835 F$=M4$:GOSUB150:F2$=F$:PX$=P2$:GOSUB500
840 RETURN
850 REM
855 POKE&H016B,197:POKE&H016C,PEEK(4684):RETURN
860 REM
865 POKE&H016B,16:POKE&H016C,205:RETURN
870 REM
875 POKE&H0168,PEEK(4681):POKE&H0169,PEEK(4682):RETURN
880 REM
885 POKE&H0168,&H10:POKE&H0169,&HE6:RETURN
900 REM
905 GOSUB9200
910 FOR A=1TO5:PRINT:NEXT:PRINTTAB(5)"1 - ENTIRE LIST":PRINTTAB(5)"2 - SEARCH FOR USER":PRINTTAB(5);">";
915 GOSUB600:PRINTCH$:PRINT:K=INSTR("12",CH$):IFK=0THEN999
920 IF K=1 THEN935
925 PRINT" NAME: ";:GOSUB675:NT$=CH$:IF NT$=""THEN999
935 PRINT:PRINT:PRINT"  PRESS 'S' TO STOP - 'P' PAUSE":PRINT:FOR A=1 TO K1
940 GET#1,A:IF UR$=NU$ OR UR$=CHR$(128) THEN 980 ELSEX=INSTR(UN$,NT$):IF K=2 AND X=0 THEN 960 ELSE X$=UN$
945 X=INSTR(X$,CHR$(0)):N$=LEFT$(X$,X-1):X$=RIGHT$(X$,50-X):X=INSTR(X$,CHR$(0)):L$=LEFT$(X$,X-1):PRINT:PRINTTAB(4)N$:PRINTTAB(4)L$:IFINKEY$="S"THEN999
960 EXEC&H10DA:CH$=CHR$(PEEK(4481)):GOSUB25:Y=INSTR("SsPp",CH$):IF Y=0 THEN 980
970 IF Y<3 THEN 999
975 EXEC&H10DA:GOSUB25:IFPEEK(4481)<>13THEN975
980 NEXTA
999 CLOSE:RETURN
1000 REM
1005 GOSUB850:GOSUB25:RUNT1170:SS$=STRING$(20,255):TT$="":CT$="":T$="":PRINT:PRINT"   WAIT....";:PR=PEEK(4620):GOSUB9400:EXEC&H10DA
1025 FOR R=1 TO K1 STEP 4
1030 GET#1,R:IF ASC(M1$)<>BC THEN 1050
1035 GOSUB825:IFK7=1THEN1046
1045 IF ASC(M2$)<=PR THEN 1060
1046 PRINT:PRINT:PRINT"YOU ARE NOT AUTHORIZED ON THIS SECTION":PRINT:CLOSE:CLOSE:BC=B0:GOTO1000
1050 NEXT R:GOSUB100
1055 BC=B0:GOTO1000
1060 BN$=M5$:BT$=M6$:T$="":PL=0
1065 FIELD#1,35 AS B$(1),35 AS B$(2),35 AS B$(3),35 AS B$(4),35 AS B$(5),35 AS B$(6),35 AS B$(7),5 AS B$(8):GET#1,R+1:FORA=1TO7:BC$(A)=B$(A):NEXTA
1075 GET#1,R+2:FORA=8TO14:BC$(A)
```

```
=B$(A-7):NEXTA:GET#1,R+3:FORA=15
TO21:BC$(A)=B$(A-14):NEXTA:POKE6
5495,0
1080 FOR A=1 TO 21
1083 IF LEFT$(BC$(A),20)=SS$ THE
N CO=A-1:GOTO1109
1084 TY$(A)=MID$(BC$(A),4,1):IFT
Y$(A)="L"ORTY$(A)="N"THENIFPL=0T
HEN PL=ASC(LEFT$(BC$(A),1))
1085 IF ASC(LEFT$(BC$(A),1))>PR
THEN 1088
1086 F$=MID$(BC$(A),2,1):GOSUB15
0:PX$=P1$:GOSUB500:IF K7=1 THEN
1088
1087 F$=MID$(BC$(A),3,1):GOSUB15
0:PX$=P2$:GOSUB500:IF K7=0 THEN
1090
1088 BC$(A)="":GOTO1100
1090 D$(A)=MID$(BC$(A),5,5)
1095 KY$(A)=MID$(BC$(A),10,1):TX
$(A)=RIGHT$(BC$(A),25):K=INSTR(T
X$(A),CHR$(0)):IFK=0THEN1100ELSE
TX$(A)=LEFT$(TX$(A),K-1)
1100 CT$=CT$+KY$(A):NEXTA
1109 PRINTSTRING$(11,8):GOSUB850
:UX=UL:IFUX<1ORUX>4THEN UX=1
1110 TT$=CT$:GOSUB1165:IFK>0THEN
1140ELSEGOSUB25:CLS:PRINT:IF UX>
2THEN1115ELSEX=INSTR(BT$,CHR$(0)
):IF X=0 THEN 1115 ELSE FOR B=1
TO X:A$=MID$(BT$,B,1):IF A$="\"
THEN PRINTCHR$(13)ELSEPRINTA$;:N
EXT B
1115 GOSUB25:ML=0:PRINT:GOSUB800
:PRINT"*";BC;"*  ";BN$:G0=0
1116 FOR A=1 TO CO
1120 GOSUB25:IF TX$(A)=STRING$(2
5,32) ORBC$(A)="" OR LEFT$(BC$(A
),25)=STRING$(25,255) THEN 1130
1125 ON UX GOTO1126,1127,1128,11
29
1126 PRINTTX$(A):GOTO1129
1127 K=INSTR(TX$(A),CHR$(32)):IF
K=0THEN1126ELSEPRINTLEFT$(TX$(A)
,K-1):GOTO1129
1128 PRINTKY$(A);" ";
1129 GOSUB1165:IFK>0THEN1140
1130 NEXT A:POKE65494,0:PRINT:IF
 PL=0 THEN PL=250
1131 GOSUB860:GOSUB100:PRINT"COM
MAND: ";:X0=0
1135 GOSUB625:IF CH$=CHR$(13) TH
ENPRINT:UX=1:PRINT:GOTO 1110 ELS
EX=INSTR(CT$,CH$):IF X>0 THEN PR
INT CH$ELSE1135
1140 FOR A=0 TO 19:IF MID$(BC$(A
),10,1)=CH$ THEN 1145 ELSE NEXT
A:GOTO1135
1145 TY$=MID$(BC$(A),4,1):D$=MID
$(BC$(A),5,5)
1150 G=ASC(TY$):CLOSE:B1=BC:GOSU
B860
1155 GOSUB9600:ON G-32 GOSUB33,3
4,35,36,37,38,39,40,41,42,43,44,
45,46,47,48,49,50,51,52,53,54,55
,56,57,58,59,60,61,62,63,64,65,6
6,67,68,69,70,71,72,73,74,75,76,
77,78,79,80,81,82,83,84,85,86,87
,88,89,90
1160 IF BC=B1 THEN 1110ELSE1000
1165 EXEC4314:CH$=CHR$(PEEK(4481
)):CH=ASC(CH$):IFCH>96ANDCH<123T
HEN CH=CH-32:CH$=CHR$(CH)
1166 CV$=INKEY$:IFCV$<>"" THEN C
H$=CV$
1167 K=INSTR(TT$,CH$):IFK>0THENP
RINT:PRINTCH$:RETURNELSERETURN
1170 REM
1175 PRINT:PRINT"SYSTEM ERROR, P
LEASE WAIT...";
1176 CLEAR1000:X0=X0+1:IFX0>3THE
N980
1180 ER=PEEK(&HFD):EL=PEEK(&HFE)
*&H100+PEEK(&HFF)
1181 IF ER=>54 THEN EA=&HC242+ER
:GOTO1185
1182 IF ER=>50 THEN EA=&H88D9+ER
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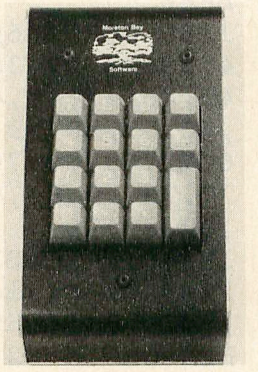
Shipping: $2 Software
Charges: $5 Hardware

MORETON BAY

MORE KEYS

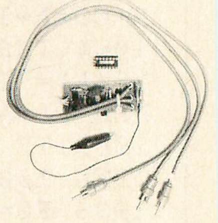


At last a quality numeric keypad for your Color Computer. This 15 key numeric pad plugs inside your computer and gives you the convenience of rapid numeric data entry. Dimensions: length 6½" (165mm), width 4" (101 mm), height 3" (76 mm). Baked black enamel finish. Specify computer model. MORE KEYS complete with cable and connector.

$69.95

DOUBLE DRIVER

The BEST monitor driver available. Color composite, monochrome and audio output. For original CoCo D, E and F boards. $24.95.



MONO II

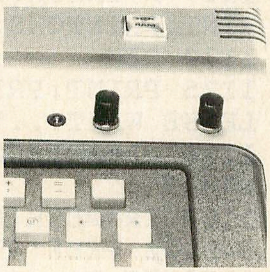
Mono II for Color Computer 2. An excellent monochrome monitor driver that has audio output also. Specify model needed.

$24.95.

RESET-POWER-SWITCHES

A REAL IMPROVEMENT

Move the power switch and reset switch where they belong. An LED power on light too! High quality parts, D and E boards and CoCo2 totally solderless kit. F board requires soldering.

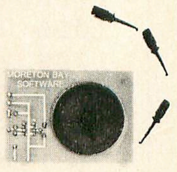


Reset 1 Coco 1 $24.95
Reset 2 CoCo 2 $27.95

Either kit add $2.00 shipping and handling.

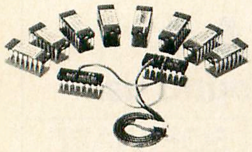
MINI MOUTH

Add sound to your mute monitor. Hear the bells and whistles of your software again. No batteries. Solderless installation.



All Color Computer Models
$24.95

64K UPGRADES

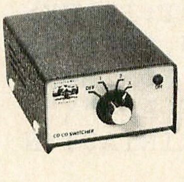


Instantly access 64K via M/L totally solderless kit to upgrade E Boards. Kit includes eight 4164 prime chips and chips U29 and U11 already soldered. SPECIAL: E Board Kit $39.95, F Board and Color Computer 2 $26.95.

Guaranteed Pretested

THE COCO-SWITCHER

A QUALITY PIECE OF HARDWARE



The CoCo Switcher allows you to hook up three peripherals to your RS-232 jack. Connect your modem, printer and any other RS-232 compatible peripheral to the CoCo Switcher. An LED on the CoCo Switcher shows if your computer is on or off at a glance, The LED flickers when transmitting or receiving data.

Dimensions: 2½" (64mm) x 4" (102 mm) x 5 7/8 (150 mm)

$39.95 plus $2.00 shipping and handling

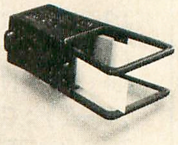
FILE CABINET

Data base, alphabetizes, sorts numeric entries, searches for key words or numbers, computes totals & averages by categories, saves records, changes or deletes them. Up to 20 entries for each record, up to 256 characters for each entry. Mailing list included. Output to screen, printer or tape. Print all or selected records, +, −, ×, ÷ Numeric entries.

16K EXB Cassette $29.95

PIEZO FAN

Two counter-oscillating mylar blades are driven at resonance by two piezo ceramic elements. No wearing parts. No RFI and no EMI. Consumes 0.11 watt at 120 VAC. Moves 5 cubic feet of air per minute. Mounts inside your CoCo. 3.2 cm. x 5.1 cm. x 8.4 cm. **Please** specify computer model number.



$29.95

USE YOUR COLOR COMPUTER TO ORGANIZE YOUR BUSINESS

MORE BUSINESS

Version 3.2. The preferred business accounting package. A completely interactive system which features a general ledger you can customize for your own business. More than 900 accounts can be added. The accounts receivable routine will print invoices, record cash sales and automatically post to the general ledger. More than 400 customer balances can be maintained and automatically aged. Print customer statements and mailing labels. Profit and loss and balance statements printed at any time. Complete audit trails. Our most powerful business package. Buy the best!

32K Disk R/S DOS $99.95

MORE INVENTORY

Maintain an inventory of over 1000 units. Total inventory value computed with a single key stroke. Print lists of stock on hand, stock on order and stock to be ordered. Can also be used by hobbyists and collectors. Now you can organize your collection in a professional manner.

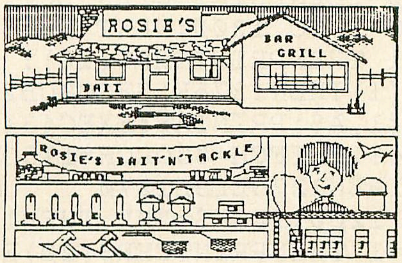
32K Disk R/S DOS $44.95

Having trouble with your CoCo? We have the chips you need. Call us. (805) 962-3127

SOFTWARE

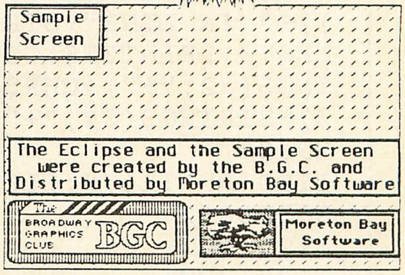
NEW!

THE VERY BEST IN GRAPHICS



ECLIPSE

Allows you to "Zoom" in on the pixels of your graphics. Precision editing for your graphic creations. With ECLIPSE you can refine detailed graphics in high resolution pictures. Design game characters. Edit fonts. Easy to use. Bonus: extra graphic screens included Requires 32K, disk $19.95



Sample Screen

The Eclipse and the Sample Screen were created by the B.G.C. and Distributed by Moreton Bay Software

The BROADWAY GRAPHICS CLUB BGC

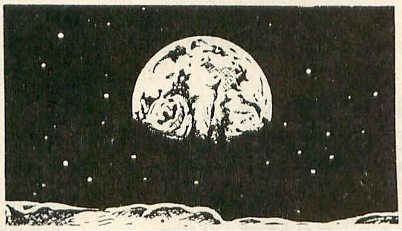
Moreton Bay Software

SAM DIAMOND, P.I.

The first of our new Sam Diamond graphic adventures. More than 40 detailed high resolution graphic scenes. A killer is loose in the city. Can you bring him to justice before he gets you? Excellent graphics and a tough mystery to solve.

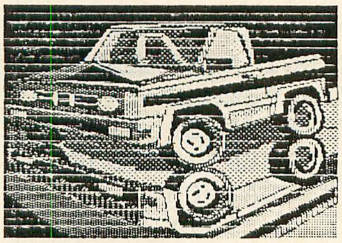
32K Disk Only $29.95
plus $2.00 shipping and handling

PLANETARIUM



PLANETARIUM

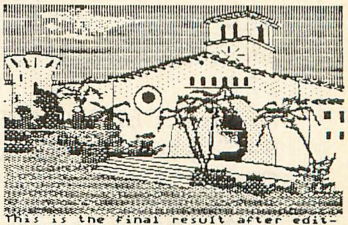
A five program celestial package. A star gazer's aid. A program to familiarize you with the appearance of the major constellations. 21 first magnitude stars. Moon phases. Day or night sky. Any latitude. 33 constellations. Charts planet locations from A.D. 0 to the year 10,000. Requires 16K Extended Basic. $19.95



GET THE MOST FROM YOUR GRAPHIC PROGRAMS

How to integrate Graphicom and CoCoMax. Two tutorial disks full of examples and suggestions. See how to create graphics step by step. Learn how to display and even animate your graphics from Basic.

1 Disk $14.95
2 Disks $24.95



This is the final result after editing the file using Graphicom.

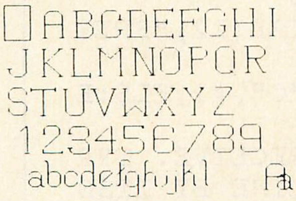
GRAPHICOM

Buy Graphicom from us and get one of our unique picture disks free! Get our improved Picture Disk One also. The first in the new generation of graphic utilities. An excellent utility. Requires: 64K EXB, Disk Drive and Joy Sticks. Three disks and the best bound documentation for only $29.95.

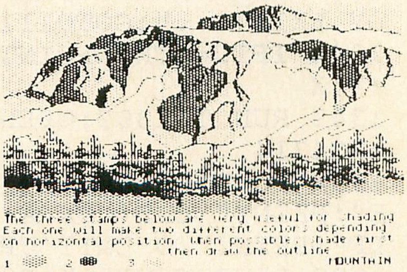
Calligraphy STAMP DISK: Useful letters and designs for making your own signs and menu screens.

Adventure Disk 1: Indoor scenes and objects. Helps you draw pictures and learn more about Graphicom.

Adventure Disk II: Outdoor scenes and objects. A graphicom tutorial as well as a useful library of images you can use.

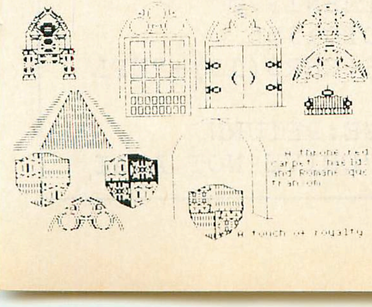


Calligraphy Disk II: 23 New letter stamp sets.



The three stamps below are very useful for shading. Each one will make two different colors depending on horizontal position. When possible, shade first then draw the outline

Adventure Disk II



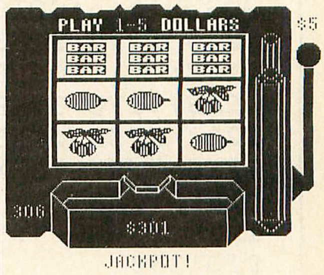
Adventure Disk 1

1 Picture Disk $15.95
2 Picture Disks $24.95
3 Picture Disks $29.95
4 Picture Disks $34.95

HOTSLOT

Own the hottest slots on the block! Run your own casino with 6 different slot machines. Control the payout Bet $1.00 to $5.00. Choose double and triple jackpots. Gamble to your heart's content. Play casino odds, moderate odds or get rich quick. Play a game of skill - SLAMSHOT! - try to stop the reels yourself.

32K EXB, Joystick optional
$24.95 Specify Disk or Tape



MORETON BAY SOFTWARE

A Division of Moreton Bay laboratory

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Send $2.00 shipping and handling per order. We ship within 1 working day on receipt of order. Blue Label Service available. California residents add 6% sales tax.

```
:GOTO1185
1183 EA=&HABAF+ER
1185 ER$=CHR$(13)+"***ERROR TYPE
 "+CHR$(PEEK(EA))+CHR$(PEEK(EA+1
))+" IN LINE"+STR$(EL)+"***":GOS
UB870:PRINTER$:GOSUB9615:TR$=STR
ING$(32,"+")+CHR$(13)+ER$+CHR$(1
3)+STRING$(32,"+")+CHR$(13):GOSU
B9600
1190 RUNT1170:CLEAR100:GOSUB880:
GOSUB860
1195 RUN
1200 REM
1205 RUNT1229:IFTD>2THENPRINT:PR
INT"FILE TO DOWNLOAD: ";:GOTO121
5
1206 IF D9=0 THEN D9=1:CH$="M":G
OTO1225
1210 PRINT:PRINT:GOSUB100:PRINT"
[M]ENU, <CR> TO EXIT OR":PRINT"N
umber to download: ";:FT$="":F$=
""
1215 GOSUB675:RUNT1229:IFCH$=""T
HEN D9=0:GOTO1110ELSEFT$=CH$:IFT
D<3THENIFLEN(CH$)>4THEN1200ELSE1
220
1216 IFLEFT$(CH$,3)<>"DIR"THEN F
$=CH$:GOTO1226ELSE D=VAL(RIGHT$(
CH$,1)):IF TD<4THEN D=ZD
1217 IFD=1THEN DIR1:GOTO1219ELSE
IFD=2THEN DIR2:GOTO1219
1218 IF D=0THEN DIR0 ELSE DIR3
1219 PRINT"FREE:";FREE(D):GOTO12
00
1220 GOSUB25:IFCH$<>"M" THEN 123
0
1225 FT$="DOWN"+D$+"/MNU:":D=-1:
GOSUB1245:GOTO1210
1226 IFTD=3THEN D=ZD ELSEPRINT"D
RIVE: ";:GOSUB600:RUNT1200:D=VAL
(CH$):IFD>3THEN1226ELSEPRINTD
1227 IFZK>0THEN X$=RIGHT$(F$,4):
IFX$="/SYS"ORX$="/BAK"ORX$="/BIN
"THEN1200
1228 F$=F$+":"+DR$(D):RUNT1290:G
OTO1230
1229 GOTO1110
1230 CLS:PRINT:PRINT:PRINT"1 - A
SCII, NO BUFFER":PRINT"2 - ASCII
, WITH BUFFER":PRINT"<CR> TO EXI
T"
1235 GOSUB600:RUNT1200:X=VAL(CH$
):B=X-1:IFX=0THENRETURNELSEIFX>0
ORX<3THENPRINTTAB(3)CH$ELSE1235
1237 IFTD>3THEN1255
1240 FT$=D$+FT$+"/DOW:":D=-1
1245 RUN T 1245
1250 IFTD=3THEN1290ELSED=D+1:IF
D>3 THEN1290ELSE F$=FT$+DR$(D)
```

```
1255 CLOSE:UNLOAD:RUNT1250:OPEN"
I",#1,F$:RUN T 1290:IFCH$="M" TH
EN1270
1260 IF B=0 THENPRINT"OPEN BUFFE
R...":FOR O=1 TO 1200:NEXT O
1265 IF B=1 THENPRINTCHR$(18);
1270 IFEOF(1)THEN1275ELSEGOSUB25
:LINEINPUT#1,A$:PRINTA$:EXEC4314
:CH=PEEK(4481):IFCH=83ORCH=115OR
INKEY$="S"THEN1275ELSE1270
1275 RUN T 1200:IFCH$="M" THEN12
80ELSEIF B=1 THENPRINTCHR$(20)EL
SEFORO=1TO1200:NEXTO
1280 CLOSE:TR$=TR$+CHR$(13)+"DOW
: "+F$+CHR$(13):GOSUB9610:GOTO12
00
1290 RUN T 1200:PRINT:PRINT"UNAB
LE TO ACCESS FILE.":PRINT:GOTO12
00
1300 REM
1305 '
1310 RUN T 1110:PE=0:PRINT:PRINT
:PRINT
1320 X=FREE(TD):IFX<5ANDTU<3THEN
PRINT"SORRY, SPACE NOT AVAILABLE
.":FORA=1TO250:NEXTA:RETURN
1325 PRINT"ENTER FILE NAME: ";:G
OSUB675:IFLEN(CH$)>8THEN1325ELSE
IFCH$=""THENRETURNELSEA$=CH$
1330 PRINT"            EXT: ";:I
FTU<2THENB$="UPL":PRINTB$ELSEGOS
UB675:IFLEN(CH$)>3THEN1330ELSEIF
CH$=""THENRETURNELSEB$=CH$
1335 IFTU>2THENPRINT"          D
RIVE: ";:GOSUB625:D=VAL(CH$):IFC
H$=""THENRETURNELSEIFD>3THEN1335
ELSEPRINTCH$
1340 IFTU<3THEN D=TD:RUN T 1390:
X=FREE(D):IFX<5THEN"SORRY, SPACE
 NOT AVAILABLE."
1342 X=FREE(D):IFX<3ANDTU<4THEN1
390ELSE FL$=A$+"/"+B$+":"+DR$(D)
:IFTU<4THEN RUNT1345:OPEN"I",#1,
FL$:CLOSE:PRINT:PRINT"FILE ALREA
DY EXIST...":GOTO1110
1344 IFTU=4THENPRINTTAB(12)"FREE
:";X
1345 RUN T 1390:OPEN"O",#1,FL$:E
XEC4314
1350 PRINT"READY TO RECEIVE. TYP
E":PRINT"'END' ON A LINE BY ITSE
LF":PRINT"TO EXIT UPLOAD.":PRINT
1355 LINEINPUT">";C$:GOSUB25:IFC
$="END"ORC$="end"THEN1370
1360 PRINT#1,C$:GOTO1355
1370 CLOSE:TR$=TR$+CHR$(13)+"UPL
: "+FL$:GOSUB9600
1375 RUNT1110:CLOSE:RETURN
1390 UNLOAD:PRINT"DRIVE NOT AVAI
```

DIGISECTOR™ DS-69 VIDEO DIGITIZER FOR THE COCO

Give your COCO the gift of sight!
The Micro Works is happy to introduce the newest member of our Digisector™ family — the DS-69 Video Digitizer for your COCO. It has all the standard features of its big brothers but comes with a price tag that's right for you.

- **High Resolution** 256 by 256 spatial resolution.
- **Precision** 64 levels of grey scale.
- **SPEED!** ½ second for a full screen of video.
- **Compactness** Self contained in a plug in Rompack.
- **Ease of Use** Software on disk will get you up and running fast!

The DS-69 Digisector opens up a whole new world for you and your COCO. Your computer can be a security system, take portraits, analyze signatures, inspect assembly work . . . the DS-69 is your COCO's eyes. Use the DS-69 and a TV camera to get fast, precise conversion of video signals into digital data.

Powerful C-SEE™ software.
C-See is a menu-driven software package included with your DS-69. It provides high speed 5 level digitizing to the screen, high precision 16 level digitizing for superb hard copy printout, and simple software control of brightness and contrast. Or call our driver routines from your own Basic program for easy 64 level random access digitizing. Pictures taken by the DS-69 may be saved on disk by C-See and then edited by our optional MAGIGRAPH package for enhancements and special effects.

John Hancock

The DS-69 comes with a one year warranty. C-See supports both cassette and disk operation with the Multi-Pak adaptor and requires 64K. Cameras and other accessories are available from The Micro Works. Let your COCO see the World!

■ DS-69 Digisector & C-See Software	$149.95
■ MAGIGRAPH Graphics Package on disk	$ 39.95

Terms: Visa, Mastercard, Check or C.O.D.

Purveyors of Fine Video Digitizers Since 1977.

The MICRO WORKS Established 1977

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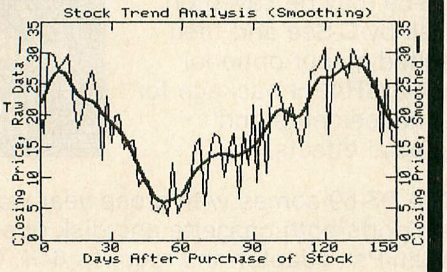
```
LABLE.":PRINT:FORT=1TO150:NEXTT:
GOTO1110
1400 REM
1405 '
1410 IF BL=255 THEN GOSUB1660:IF
 BL=255 OR CH$="" THEN RETURN
1411 X=FREE(PEEK(4671)):IF X<3 T
HEN PRINT:PRINT"MESSAGE BASE FUL
L!":RETURN
1415 MD$=CHR$(0):MI$=MD$
1420 GOSUB25:PRINT:PRINT:MF$=NA$
:PRINT"FROM: ";MF$:EXEC&H10DA:PR
INT"  TO: ";:GOSUB675:IFCH$=""TH
ENRETURN
1435 MT$=CH$
1440 PRINT"SUBJ: ";:GOSUB675:IFC
H$=""THEN1440ELSEMS$=CH$
1445 X=FREE(PEEK(4670)):Y=FREE(P
EEK(4671)):IF X<2ORY<2 THEN PRIN
T"MESSAGE BASE FULL!":RETURN ELS
E IFML>0THEN P$="10000000":GOTO1
450ELSEIFPF=0THEN P$="00000000":
GOTO1450ELSEPRINT"MESSAGE PRIVAT
E (Y/N)? ";:GOSUB625
1446 IFCH$="Y"THEN P$="10000000"
:PRINT"YES"ELSEIFCH$="N"THEN P$=
"00000000":PRINT"NO"ELSEGOSUB625
:GOTO1446
1450 K=LEN(MF$)+LEN(MT$)+LEN(MS$
)+2:IFK>64THENPRINT"SUBJECT TOO
LONG":PRINT"LIMIT TO ";64-LEN(MF
$)-LEN(MT$)-2:PRINT"TRUNICATING.
." ELSE 1452
1451 IFLEFT$(MS$,5)="REPLY"THEN
MS$=RIGHT$(MS$,LEN(MS$)-(K-64))
ELSE MS$=LEFT$(MS$,LEN(MS$)-(K-6
4)):GOTO1450
1452 GOSUB25:PRINT:PRINT:PRINTTA
B(5)"FROM: ";MF$:PRINTTAB(5)"  T
O: ";MT$:PRINTTAB(5)"SUBJ: ";MS$
1453 IFP$="10000000"THENPRINTTAB
(5)"PRIVATE MESSAGE"ELSEPRINTTAB
(5)"PUBLIC MESSAGE"
1455 IF ML=2 THEN 1465 ELSE PRIN
T:PRINT"CORRECT (Y/N)? ";
1460 GOSUB600:K=INSTR("NnYy",CH$
):IFK>2THENPRINT"YES":GOTO1463EL
SEIFK>0THEN1415ELSE1460
1463 PRINT:PRINT
1465 PRINT:PRINT"ENTER MESSAGE.
MAXIMUM OF 2000":PRINT"BYTES. MA
XIMUM OF 40 LINES.":PRINT"PRESS
<ENTER> ON LINE BY ITSELF":PRINT
"TO EXIT.":PRINT:LE=0:EXEC&H10DA
1470 FOR LL=1 TO 40
1475 PRINT">";:LINEINPUTCH$:IFCH
$=""THEN1497
1485 L$(LL)=CH$:GOSUB25:IF LE+LE
N(CH$)>1999THEN1496
1490 '
1491 LE=LE+LEN(CH$):IF LL>35 THE
NPRINT"YOU ONLY HAVE";40-LL;"LIN
ES LEFT."
1495 IFLE>1500THENPRINT"::";2000
-LE;" BYTES LEFT..."
1496 IF LE<2000THENNEXT LL ELSEP
RINT"BUFFER FULL!!!"
1497 POKE65494,0
1500 PRINT:GOSUB100:PRINT"<L>IST
 <E>DIT <C>ONTINUE <S>AVE <A>BOR
T ";
1505 CH=1:GOSUB625:K=INSTR("LECS
A",CH$):IFK=0THEN1505
1510 PRINTCH$:ON K GOTO 1515,152
0,1475,1555:RETURN
1515 FOR C=1 TO LL-1:GOSUB25:PRI
NTC": ";L$(C):NEXTC:GOTO1500
1520 PRINT"LINE TO EDIT: ";
1525 CH=1:GOSUB650:X=VAL(CH$):IF
X<1THEN1500
1530 IF X>LL THEN PRINT"NON-EXIS
TING LINE":GOTO1520
1535 PRINT"PRESENT LINE READS:":
PRINT:PRINTL$(X):PRINT:PRINT
1540 PRINT"ENTER NEW LINE:":GOSU
B650
1545 IFCH$=""THENPRINT:PRINT"LIN
```



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* Automatically Scales and Labels *All Three* of the Axes.
* Calculates Math Functions, Integrals and Moving Averages.
* Works with all CoCo models - requires Extended BASIC.
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```
E UNCHANGED":GOTO1500
1550 L$(X)=CH$:PRINT"LINE CHANGE
D":GOTO1500
1555 LL=LL-1
1560 PRINT:PRINT"SAVING MESSAGE.
 . .":GOSUB850
1564 IF K8=1 THEN 1565 ELSE GOSU
B9000
1565 K1=LOF(1):IF K1=0 THEN MN=1
:GOTO1575ELSE GET#1,1
1570 MI=CVN(H1$)+1:IF MI>60000 T
HEN MI=0
1575 LSET H1$=MKN$(MI):F$=P$:GOS
UB175:LSET H2$=F$:LSET H5$=MF$+N
U$+MT$+NU$+MS$+STRING$(80,NU$)
1580 GOSUB100:Q$=CHR$(HR)+CHR$(M
N):LSET H4$=Q$:Q$=CHR$(PEEK(4608
))+CHR$(PEEK(4609))+CHR$(PEEK(46
10)):LSET H3$=Q$:LSET H8$=CHR$(B
L)
1584 IF K8=1 THEN 1585 ELSE GOSU
B9100
1585 K2=LOF(2):K2=K2+1:LSET H6$=
MKN$(K2)
1590 A$=""
1595 B$="":LSET MG$=STR$(MI):PUT
#2,K2
1600 FOR A=1 TO LL
1605 B$=L$(A)+CHR$(13):IFLEN(A$)
+LEN(B$)>250THEN A=A-1:A$=A$+STR
ING$(80,0):C$="":GOTO1620ELSE A$
=A$+B$
1610 L0=LEN(A$):IFL0<80THEN1630
1615 C$=RIGHT$(A$,L0-80):A$=LEFT
$(A$,80)
1620 LSET MG$=A$:K2=K2+1:PUT#2,K
2:A$=""
1625 IFLEN(C$)>0THEN A$=C$:GOTO1
610
1630 NEXTA
1635 IF LEN(A$)=0 THEN 1645
1640 LSET MG$=A$+STRING$(80,0):K
2=K2+1:PUT#2,K2
1645 LSET MG$=STRING$(80,255):K2
=K2+1:PUT#2,K2
1650 LSET H7$=MKN$(K2):PUT#1,K1+
1:PUT#1,1:IFK1<2THEN PUT#1,2:RE=
RE+1
1655 GOSUB860:IF K8=1 THEN RETUR
N ELSE CLOSE:RETURN
1660 PRINT:PRINT:IF PR=255 THEN
1662 ELSE IF BA$=""THEN P9=1:GOS
UB339:GOSUB25:GOTO1660
1662 PRINT:PRINT:PRINT"BOARD # O
R '?' ";
1665 CLOSE:GOSUB650:IF CH$="?" T
HEN 1675 ELSE CH=VAL(CH$)
1670 IF CH>-1 AND CH<255 THEN IF
 PR=255 THEN  BL=CH ELSE 1680
1671 RETURN
1675 GOSUB339:GOTO1660
1680 FOR X=1 TO LEN(BA$)
1685 IF ASC(MID$(BA$,X,1))=CH TH
EN BL=CH:GOTO1671
1690 NEXT X:PRINT"NOT AUTHORIZED
 TO";CH
1695 GOTO1660
1900 REM
1905 '
1910 '
1920 PRINT:PRINT"KILL MESSAGE #"
;
1925 GOSUB650:X=VAL(CH$):IFX=0TH
ENRETURN
1930 GOSUB9000:PRINT
1935 FOR R0=2 TO K1:GET#1,R0:IFC
VN(H1$)=X THEN 1945
1940 NEXT R0:PRINT"UNABLE TO LOC
ATE OR ALREADY DELETED.":CLOSE:R
ETURN
1945 F7=1:GOSUB2360:PRINT:F7=0
1950 IF NA$=MT$ OR NA$=MF$ OR PR
=255 THEN 1960 ELSE PRINT"YOU AR
E NOT AUTHORIZED!":PRINT:CLOSE:R
ETURN
1960 F$=H2$:GOSUB150:MID$(F$,2,1
)="1":GOSUB175
```

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We have combined several programs from the May, June & July 1985 issues of our newsletters and are offering them as a package. Any one program would be worth the price we are asking. The package consists of the following 6 programs.

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```
1965 LSET H2$=F$:PUT#1,R0
1970 CLOSE:RETURN
2000 REM
2005 F5=0:K9=0:UX=UL
2010 TT$="FRNIA"
2020 PRINTCHR$(12):CLS:PRINT:PRI
NT:IF UX>2 THEN 2050ELSEPRINT"
   MESSAGE BASE:"
2025 PRINTTAB(5)"<F>ORWARD":GOSU
B1165:IFK>0THEN2060
2030 PRINTTAB(5)"<R>EVERSE":PRIN
TTAB(5)"<N>EW":GOSUB1165:IFK>0TH
EN2060
2040 PRINTTAB(5)"<I>NDIVIDUAL":P
RINTTAB(5)"<A>BORT TO MENU"
2050 PRINTTAB(5)"COMMAND: ";
2055 GOSUB625:IFCH$=CHR$(13)THEN
 UX=1:GOTO2020ELSEK=INSTR("FRNIA
",CH$):IF K=0 THEN2055ELSEPRINTC
H$
2060 ON K GOTO 2070,2070,2070,20
70,2065
2065 UX=UL:CLOSE:RETURN
2070 GOSUB9000:GOSUB9100:GET#1,1
:RE=CVN(H1$)
2080 FORB=2 TO K1:GET#1,B:F$=H2$
:GOSUB150:IFMID$(F$,2,1)<>"1"THE
N RS=CVN(H1$):GOTO2083 ELSE NEXT
 B:RS=RE
2083 IFK=3THENGOSUB2280:GOTO2190
2085 PRINT:PRINT"SYSTEM HAS MESS
AGES";RS;"TO";RE:EXEC&H10DA
2090 PRINT"ENTER STARTING MESSAG
E: ";:K1=LOF(1)
2095 GOSUB650:R=VAL(CH$):IF R=0
THEN2105
2100 IF R<RS OR R>RE THEN CLOSE:
RETURN
2105 IF K=4 AND R=0 THEN2100ELSE
GOSUB2280:ON K GOTO 2110,2135,21
90,2160
2110 REM
2112 IF R=0 THEN R=RS
2115 FOR R0=2 TO K1
2120 GET#1,R0:RH=CVN(H1$):IF RH<
R THEN 2130
2125 GOSUB2300:IFF6=1THENGOSUB22
20
2130 IFK9=1THEN2185ELSENEXT R0:G
OTO2185
2135 REM
2137 IF R=0 THEN R=RE
2140 FOR R0=K1 TO 2 STEP -1
2145 GET#1,R0:RH=CVN(H1$):IF RH>
R THEN 2155
2150 GOSUB2300:IFF6=1THENGOSUB22
20
2155 IFK9=1THEN2185ELSENEXT R0:G
OTO2185
```

```
2160 REM
2162 IF R=0 THEN CLOSE:RETURN
2165 FOR R0=2 TO K1
2170 GET#1,R0:RH=CVN(H1$):IF RH<
>R THEN 2180
2175 GOSUB2300:IFF6=1THENGOSUB22
20:GOTO2186ELSE2186
2180 NEXT R0:PRINT"MESSAGE NOT A
VAILABLE":GOTO2186
2185 IFF5=0THENPRINT:PRINT"NO ME
SSAGES FOUND!":PRINT
2186 CLOSE:RETURN
2190 REM
2195 IF LM=>RE THEN2185
2200 FOR R0=2 TO K1
2205 GET#1,R0:RH=CVN(H1$):IF RH<
=LM THEN 2215
2210 GOSUB2300:IFF6=1THENGOSUB22
20
2215 IFK9=1THEN2185ELSENEXT R0:G
OTO2185
2220 REM
2225 IFF4=0THENRETURNELSEPRINT:G
OSUB100:PRINT"[N]EXT [R]EAD [S]T
OP ";
2230 GOSUB625:IFCH$="D"ANDPR>250
THEN T$="D":GOSUB2455 ELSE K=INS
TR("NRS",CH$):IFK=0THEN2230ELSEP
RINTCH$:PRINT:PRINT
2235 ON K GOTO 2240,2250,2260:GO
TO2230
2240 RETURN
2250 GOSUB2395:RETURN
2260 K9=1:RETURN
2280 PRINT:IFUL>2THENPRINT"PAUSE
? ";:ELSEPRINT"PAUSE AFTER EACH
MESSAGE? ";
2285 GOSUB625:C=INSTR("YN",CH$):
ON C+1 GOTO 2285,2295,2290
2290 PS=1:PRINT"NO":RETURN
2295 PS=0:PRINT"YES":RETURN
2300 REM
2305 K9=0:F4=0
2310 ON G0+1 GOTO 2315,2315,2320
,2320
2315 IF ASC(H8$)<>BQ THEN RETURN
 ELSE 2335
2320 IF ASC(H8$)<=BQ THEN 2335 E
LSE2330
2325 '
2330 RETURN
2335 F$=H2$:GOSUB150:IFMID$(F$,2
,1)="1"THENRETURN
2345 GOSUB25:F4=0:BR=ASC(H8$):R1
=CVN(H6$):R2=CVN(H7$):GET#2,R1:I
FVAL(MG$)<>RH THEN RETURN
2360 M0=CVN(H1$):KF=INSTR(H5$,NU
$):MF$=LEFT$(H5$,KF-1)
2365 KT=INSTR(KF+1,H5$,NU$):XX=K
```

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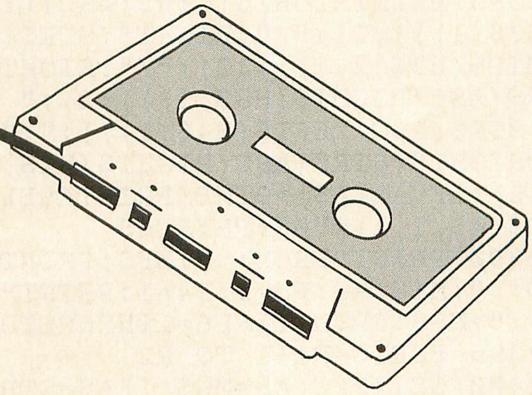

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```
T-KF-1:IFXX<1THEN MT$="":GOTO237
0ELSE MT$=MID$(H5$,KF+1,XX):IFF7
=1THENRETURN
2370 KS=INSTR(KT+2,H5$,NU$):XX=K
S-KT-1:IFXX<1THEN MS$="":GOTO237
1ELSE MS$=MID$(H5$,KT+1,XX):PF=0
2371 FOR YY=1 TO 5:PRINT:NEXT YY
:CLS:GOSUB800:IFMID$(F$,1,1)="1"
ORML=1THEN IF MT$=NA$ OR MF$=NA$
 OR MQ=1 OR G0=1 OR G0=3 THENPRI
NT:PF=1:PRINT"PRIVATE":GOTO2375E
LSERETURN
2374 PRINT:PRINT
2375 IFMID$(F$,3,1)="1"THEN X$="
 <RCVD>" ELSE IF NA$=MT$ THEN MI
D$(F$,3,1)="1":GOSUB175:LSET H2$
=F$:PUT#1,R0:GOSUB150:X$=" <RCVD
>"ELSEX$=""
2381 F5=1:GOSUB25:PRINT"MESSAGE
#";M0;" *";ASC(H8$);"*"
2385 PRINTRIGHT$(STR$(ASC(LEFT$(
H3$,1))),2);"/";RIGHT$(STR$(ASC(
MID$(H3$,2,1))),2);"/";RIGHT$(ST
R$(ASC(RIGHT$(H3$,1))),2);"    "
;STR$(ASC(LEFT$(H4$,1)));":";:A$
=RIGHT$(STR$(ASC(RIGHT$(H4$,1)))
,2):IFVAL(A$)>9THENPRINTA$ELSEMI
D$(A$,1,1)="0":PRINTA$
2390 PRINT"FROM: ";MF$:PRINT"  T
O: ";MT$;X$:F5=1:F4=1:PRINT"SUBJ
: ";MS$:PRINT:IFF6=1THENRETURN
2395 FOR C=R1+1 TO R2
2400 GET#2,C:A$=MG$:IFA$=STRING$
(80,255)THEN2425
2405 GOSUB25:KX$="NS"+CHR$(13)
2406 K=INSTR(A$,CHR$(0)):IFK>1TH
EN A$=LEFT$(A$,K-1)
2408 FOR CC=1 TO LEN(A$) STEP 10
2410 PRINTMID$(A$,CC,10);:EXEC&H
10DA:CH$=CHR$(PEEK(4481)):GOSUB2
5:IF CH$=CHR$(0)THEN2416
2412 K=INSTR("NSP",CH$):IF K=0 T
HEN K=INSTR("nsp",CH$):IF K=0 TH
EN 2416
2414 ON K+1 GOTO 2416,2450,2465
2415 EXEC&H10DA:IFPEEK(4481)<>13
THEN2415
2416 NEXTCC:GOSUB25
2420 NEXTC
2425 PRINT:PRINT:GOSUB100:IFPS=0
THEN2430ELSE IF MF$=NA$ OR MT$=N
A$ THEN 2430ELSE2450
2430 GOSUB25:IF MF$=NA$ OR MT$=N
A$ OR PR=>250 THEN T$="DN":PRINT
"<D>ELETE <N>EXT ";:ELSET$=CHR$(
255)+"N":PRINT"<N>EXT ";
2431 IF PR=>PL THEN T$=T$+"RS":P
RINT"<R>EPLY <S>TOP ";:ELSE T$=T
$+CHR$(255)+"S":PRINT"<S>TOP ";
```

```
2435 GOSUB25
2440 GOSUB625:K=INSTR(T$,CH$)
2445 IF K=0 THEN 2440ELSEPRINTCH
$:ON K GOTO 2455,2450,2459,2465
2450 IF ZK>0ANDMT$=NA$ THEN2455E
LSERETURN
2455 IFLEFT$(T$,1)="D"THEN MID$(
F$,2,1)="1":GOSUB175:LSET H2$=F$
:PUT#1,R0
2456 PRINT"REPLY (Y/N)? ";:GOSUB
600:IFCH$="Y"ORCH$="y"THENPRINT"
YES":GOTO2460ELSEPRINT"NO":RETUR
N
2459 IF ZK>0ANDMT$=NA$ THEN MID$
(F$,2,1)="1":GOSUB175:LSET H2$=F
$:PUT#1,R0
2460 IFPR<PL THENPRINT:PRINT"YOU
 ARE NOT AUTHORIZED!":RETURN ELS
E PRINT:BL=BR:K8=1:MT$=MF$:MF$=N
A$:IFBR>249THEN BL=255:GOSUB1660
:GOSUB9000:GOSUB9100:IFBL=255OR
CH$="" THEN K8=0:RETURN
2461 IFLEFT$(MS$,9)="REPLY TO "
THEN 2462 ELSE MS$="REPLY TO "+M
S$
2462 GOSUB1445:K8=0:RETURN
2465 K9=1:IFZK>0ANDMT$=NA$ THEN2
455ELSERETURN
7000 REM
7005 '
7010 UNLOAD
7015 T$=RIGHT$(D$,5):BU=VAL(LEFT
$(T$,1)):E$=RIGHT$(T$,4):PRINT:P
RINT:FT$=X$+E$+"/TXT":D=-1
7025 RUN T 7070
7030 D=D+1:IFD>3THEN RUNT7070:RE
TURN
7035 F$=FT$+":"+DR$(D)
7040 RUNT7030:OPEN"I",#1,F$:IF B
=1THENPRINTCHR$(18);
7041 RUN T 7060
7045 IFEOF(1)THEN7060ELSEGOSUB25
:LINEINPUT#1,S$:GOSUB25
7050 PRINTS$:EXEC&H10DA:CH$=CHR$
(PEEK(4481)):GOSUB25:IFCH$="S"OR
CH$="s"THEN7060
7056 K=INSTR("Pp",CH$):IFK=0THEN
7045
7057 EXEC&H10DA:GOSUB25:IFPEEK(4
481)<>13THEN7057ELSE7045
7060 RUNT7070:CLOSE:IF B=1THENPR
INTCHR$(20):RETURNELSERETURN
7065 D=D+1:IF D>3 THEN CLOSE::PR
INT:PRINT"FILE NOT AVAIABLE":RET
URN ELSE7025
7070 GOTO1000
7100 REM
7105 '
7110 '
```

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- Fast, easy installation—no soldering
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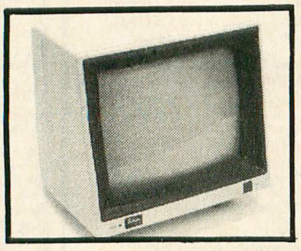
- Smooth "Touch Typist" feel—no sagging
- U.S. made—high quality, quad gold contacts
- Professional, low profile, finished appearance

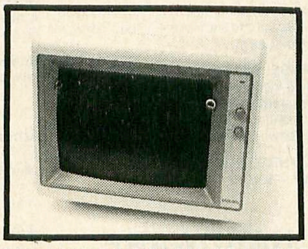
* Computers produced after approximately October 1982 require an additional keyboard plug adapter. Please add $3.95.

QUALITY VIDEO MONITORS



SAKATA COLOR SC-100 $199.95

The SC-100 is a streamlined 13" composite monitor which produces sharp, brilliant colors. The cabinet is made of durable styrene and is available in an attractive off-white color. Includes audio with speaker and earphone jack. We highly recommend this color monitor because of its excellent performance and beautiful styling.



CAMBRIDGE GRAPHICS AMBER SCREEN MONITOR $119.95

A 12" amber screen composite monitor of the highest quality with exceptional reliability and performance. 18 MHZ bandwidth. Attractive off-white cabinet. We use this monitor in our offices.

We carry other brands also.
Call for additional information.

Order a quality monitor from us and get a Universal Video Driver for only $24.95 **Save $5.00**

SERIAL TO PARALLEL PRINTER INTERFACE

300 to 9600 baud. Complete with all cables and power supply.

NEW ITEM

Only $49.95

NEED MORE MEMORY? 64K Memory Expansion Kit

All parts and complete instructions (for 'E' and 'F' boards and CoCo II).

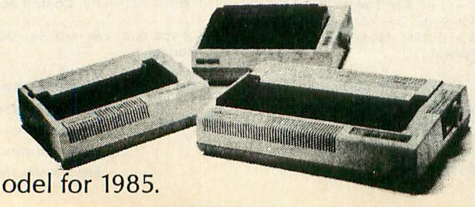
NOW ONLY $14.95

PRINTERS

NEW ITEM

NEW Star Gemini SG-10 model printer

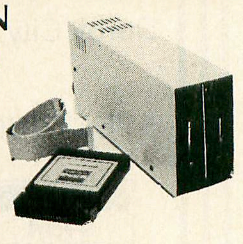
star®



Only $249.95

120 cps w/true descenders, 2K buffer, proportional spacing. New model for 1985.

GREAT BARGAINS ON COCO DISC DRIVES!



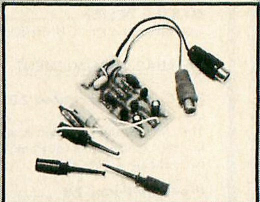
COMPLETE SYSTEMS INCLUDE:

- Hi-Quality Teac Thin Line Drives
- Attractive, Beige Dual Drive Cabinet/Power Supply
- Fill Panel for Single Drive Disc Systems
- Radio Shack or NEW TYPE J & M Disc Controller Offering Switch Selectable Roms and Parallel Printer Port
- Cable and Operating Manual
- Full 90 Day Warranty

Single Drive (SSDD) in Dual Cabinet w/Controller	$299.95
Additional Drive	89.95
Two Drives (SSDD) in Dual Cabinet w/Controller	384.95
Single Drive (DSDD) in Dual Cabinet w/Controller	**339.95**
Additional Drive	**119.95**
Two Drives (DSDD) in Dual Cabinet w/Controller	**449.95**
Dual Cabinet/Power Supply	79.95
Disc Controller (Radio Shack or J & M)	139.95
Connecting Cable	24.95
Radio Shack DOS ROM 1.1 or J/DOS w/Manual	39.95

UNIVERSAL VIDEO DRIVER

- Works with Monochrome Monitors
- Works with Color Monitors
- Easy Installation—No Soldering



ENABLES YOUR COCO TO OPERATE WITH A VIDEO MONITOR INSTEAD OF A TELEVISION.

Carefully engineered to work with **ALL** Color Computer models, including the new **COCOII**.

- Great Price! **ONLY $29.95**

$ Save Money on Your Cassette & Disc Supplies $

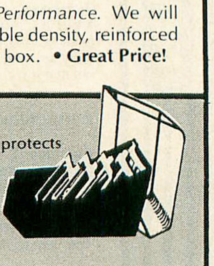
We buy cassettes and discs in large quantities for our own use and can pass the savings on to you.

C-10 Cassettes w/labels	.59 ea	10 for $5.50
Cassette storage box	.25 ea	10 for 2.00
Basic 1.2 ROM		$39.95
Extended 1.1 ROM w/Manual		49.95
Disc 1.1 ROM or J/DOS ROM w/Manual		39.95

5¼ Discs

High quality, nationally advertised brand. *Guaranteed Performance.* We will replace any disc that fails during normal use. Discs are double density, reinforced hub with sleeve. $12.95 for 10 discs in an attractive storage box. **• Great Price!**

NEW! DISC STORAGE



Attractive, heavy duty, smoked acrylic case. Holds and protects up to 75 5¼" discs with six moveable, indexed dividers.

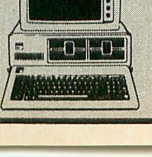
SUPER BARGAIN — ONLY $9.95

SPECIAL—Purchase this storage case including 10 discs for only $21.95

"The Connecting Link"

Only $29.95

CoCo-Util is a valuable utility program that allows you to transfer Tandy Color Computer disc files to your MS-DOS machine. You may also transfer MS-DOS files to a Color Computer disc. CoCo-Util will save you countless hours of retyping . . . a great new utility.



PC-XT II

We now offer IBM PC-XT compatible computer systems. Don't settle for a Tandy 1000 or other standard PC until you check our systems and prices.

Starting at $865.

SERIOUS STUFF

ACCOUNTING SYSTEM

The Mark Data Products Accounting System is ideal for the small businessman needing a fast, efficient means to process income and expenses, prepare detailed reports and maintain most of the information required at tax time. The system is a family of programs which operate by means of a "menu" selection scheme. When the operator selects a task to perform, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary accounting reports including a transaction journal, a P & L or income report, an interim or trial balance and a balance sheet.

This accounting software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

ORDER ENTRY SYSTEM

The Mark Data Product sales order processing system provides a fast, efficient means to enter orders, print shipping papers and invoices, prepare sales reports, and monitor receivables. The system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

This order entry software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

EASY EDIT

Easy-Edit is a versatile, easy to use text editor which is particularly convenient for assembly language and BASIC programming. This editor offers powerful text handling capabilities along with many special features including a built-in disc operating system, 32/64K memory sense, a 51 character by 24 line screen, auto key repeat, extensive error reporting, and complete compatibility with popular assemblers. Requires 32K and at least one disc drive. Master disc and instructions are packaged in an attractive 3-ring binder. **$34.95**

EASY-FILE Data Management System

Rainbow, Nov. '84 *"Easy File is one program that lives up to its name. . . Easy File is so easy it speaks for itself."*

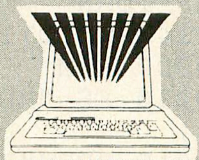
Hot CoCo, Feb. '85 *"I've examined four database programs for the CoCo in the last few months. Easy File is the easiest to master and the one that best addresses my needs. If you need to organize the information in your life, Easy File might just be the best method."*

Need a good mailing list or customer list program? How about a program to keep track of your investments, your computer magazines, or record collection? Do you have an inventory of all household items for insurance purposes? **EASY-FILE** will do all of these things and many more. The **EASY-FILE** master disc and instructions are packaged in an attractive 3-ring binder. Requires 32K and at least one disc drive.

Order Yours Now! Get Organized for Only $59.95!

SUPER SCREEN

The Color Computer Supercharger



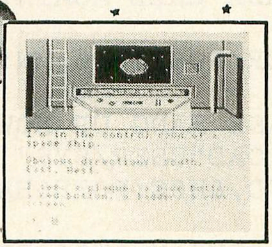
- A big 52 character by 24 line screen
- 'PRINT @' is fully implemented on the big screen
- Easily combine text with hi-res graphics
- Auto-key repeat for greater keyboard convenience
- The 'ON ERROR GOTO' statement is fully implemented
- Control codes for additional function

Guaranteed to be the most frequently used program in your software library. . . once you use it you won't be without it! **Cassette $29.95 Disc $32.95**

JUST FOR FUN

Adventures Now Available for IBM & Tandy 1000/1200

Adventure and Arcade Games • Cassette $24.95 Disc $27.95 • All require 32K



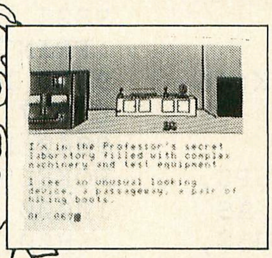
```
I'm in the control room of a
space ship.

Obvious directions: South,
East, West

I see: a plaque, a blue button,
a red button, a ladder, a view
screen.
```

TREKBOER

This exciting hi-res **adventure** begins aboard the starship Trekboer in the 21st century. Life on Earth is threatened by a deadly virus and your mission is to search the frontiers of space and return with a cure to save mankind from disaster.



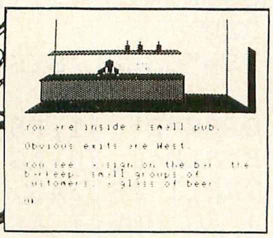
```
I'm in the Professor's secret
laboratory filled with complex
machinery and test equipment

I see: an unusual looking
device, a passageway, a pair of
hiking boots.

OK, 667█
```

CALIXTO ISLAND

A valuable museum treasure has been stolen; can you recover it??? This is a challenging **adventure** with an occasional twist of humor. You'll visit a secret laboratory, a Mayan pyramid, and you'll meet crazy Trader Jack—all in living color and exciting detail.



```
You are inside a small pub.

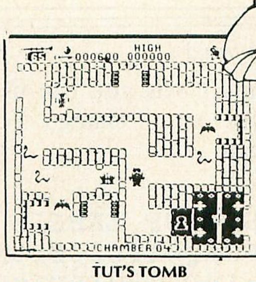
Obvious exits are West.

You see: a sign on the bar, the
barkeep, small groups of
customers, a glass of beer

OK
```

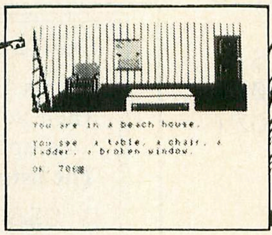
SHENANIGANS

Countless legends tell of a magnificent pot of gold hidden at the end of the rainbow. Many have attempted to find the marvelous treasure but success has eluded them and it remains hidden to this day. You, as a dedicated **adventurer**, have determined to search for the fabled riches.



TUT'S TOMB

Explore the ancient, mystical tomb of the great Pharoah. Find the magical keys which lead you to unbelievable treasures as you outmaneuver the creatures that slither and swarm about you. Super fast **arcade** action—this one will knock your socks off.



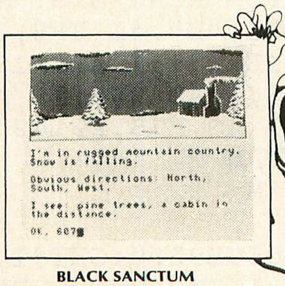
```
You are in a beach house.

You see: a table, a chair, a
ladder, a broken window.

OK, 706█
```

SEA SEARCH

Get your shark repellant and scuba tanks ready! The graphics in this **adventure** are truly outstanding and the underwater scenes are unforgettable. You'll run into a pirate, a mermaid and some hungry sharks in this coloful and unique treasure hunt.



```
I'm in rugged mountain country.
Snow is falling.

Obvious directions: North,
South, West.

I see: pine trees, a cabin in
the distance.

OK, 687█
```

BLACK SANCTUM

Encounter the forces of black magic as you roam around an 18th century monastery. You'll see all the evil locations in this spooky **adventure**; you'll love searching for and destroying evil in this classic tale. A MUST for every adventure game fan!

SHIPPING: All orders under $100 please add $2 regular, $5 air. All orders over $100 please add 3% regular, 8% air. California residents please add 6% sales tax. Orders outside the continental U.S., check with us for shipping amount; please remit U.S. funds. Software authors—contact us for exciting program marketing details. We accept MasterCard and VISA. Distributed in Canada by Kelly Software.

FREE—Send for our free catalog flier.

MD

Mark Data Products

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```
7115 PRINT:PRINT:PRINT"PAGING SY
SOP..."
7120 FORC=1TO15:IFINKEY$<>""THEN
7130ELSEPRINT".";:SOUND150,5:NEX
TC:GOTO7125
7125 PRINT:PRINT"SYSOP HAS BEEN
PAGED. PLEASE":PRINT"CONTINUE TO
 USE THE SYSTEM.":PRINT"HE WILL
BREAK IN IF AVAILABLE.":RETURN
7130 GOSUB860:GOSUB880:POKE65494
,0:PRINT:PRINT:PRINT"SYSOP ENTER
ING CHAT"
7135 LINEINPUT">";A$:IFA$="\"THE
NRETURN
7145 GOTO7135
9000 REM
9010 F$="HDR/SYS:"+DR$(PEEK(4670
))
9015 OPEN"D",#1,F$,110:FIELD#1,5
 AS H1$,1 AS H2$,3 AS H3$,2 AS H
4$,80 AS H5$,5 AS H6$,5 AS H7$,1
 AS H8$,8 AS SP$:K1=LOF(1):RETUR
N
9100 REM
9110 F$="MSG/SYS:"+DR$(PEEK(4671
))
9115 OPEN"D",#2,F$,80:FIELD#2,80
 AS MG$:K2=LOF(2):RETURN
9200 REM
9205 F$="USERL/SYS:"+DR$(PEEK(46
72))
9210 OPEN"D",#1,F$,96
9215 FIELD#1,50 AS UN$,8 AS UP$,
1 AS UR$,1 AS UA$,1 AS U1$,1 AS
U2$, 1 AS UU$,1 AS UE$,5 AS U5$,
5 AS UM$,5 AS UD$,1 AS U3$,1 AS
U4$,1 AS UO$,1 AS UL$,4 AS US$,9
 AS SP$
9220 K1=LOF(1):RETURN
9400 REM
9405 FF$="MENU/SYS:"+DR$(PEEK(46
73)):OPEN"D",#1,FF$,250
9410 FIELD#1,1 AS M1$,1 AS M2$,1
 AS M3$,1 AS M4$,16 AS M5$,200 A
S M6$,1 AS M7$,29 AS M8$:K1=LOF(
1):RETURN
9500 REM
9505 '
9510 GOSUB9200:GET#1,1
9520 K=INSTR(UN$,CHR$(0)):NA$=LE
FT$(UN$,K-1):PR=ASC(UA$):F$=U1$:
GOSUB150:P1$=F$:F$=U2$:GOSUB150:
P2$=F$:UL=ASC(UL$):IF UL<1ORUL>4
THENUL=1
9550 BC=ASC(UE$):LM=CVN(UM$):POK
E4619,ASC(UO$):POKE4628,UL:POKE4
618,BC:POKE4620,PR:POKE4621,ASC(
U1$):POKE4622,ASC(U2$):CLOSE:RET
URN
9600 REM
9605 TR$=TR$+BN$+"("+CH$+") "
9610 IFLEN(TR$)<64THENRETURN
9615 FR=PEEK(4669):RUNT9670:IFFR
=0THEN9635ELSEIFFR=1THEN9640ELSE
IFFR=3THEN9660ELSECLOSE:F$="TRAC
ER/SYS:"+DR$(PEEK(4675)):OPEN"D"
,#1,F$,128
9616 FR=FREE(PEEK(4675)):IFFR<3T
HENCLOSE:RETURN
9620 FIELD#1,128 AS X$:K1=LOF(1)
:K1=K1+1:LSET X$=TR$+CHR$(0):PUT
#1,K1
9635 CLOSE:TR$="":RETURN
9640 OPEN"O",-1,"TRACER/SYS":PRI
NT#-1,TR$:GOTO9635
9660 PT=PEEK(&HFF22)AND1:IFPT=1T
HEN9635ELSEPRINT#-2,TR$:GOTO9635
9670 POKE4669,0:GOTO1000
9800 REM
9805 '
9810 RUN T 9840:FORA=1TO10:PRINT
:NEXTA
9815 F3=1:GOSUB100:GOSUB710:TR$=
TR$+CHR$(13)+TI$:GOSUB9615
9820 PRINT:PRINT:PRINT"THANKS FO
R CALLING COBBS."
9825 PRINT"PLEASE CALL AGAIN..."
:PRINT:PRINT
9830 POKE4615,HR:POKE4616,MN:POK
E4617,SS
9840 PRINT"PLEASE HANG UP NOW.":
POKE65386,106:LOAD"USER/SYS",R
10000 POKE&HAC7D,&H0E:POKE&HAC7E
,&H00:MOTOROFF
10005 X=&H112B:POKE X,&H86:POKE
X+1,&H0D:POKE X+2,&HB7:POKE X+3,
&H11:POKE X+4,&H81:POKE &H1127,&
H10
10010 RUN
```

One-Liner Contest Winner . . .

This program prints labels you can use to show when your car last had an oil change. You can use "one-up" mailing labels.

The listing:

```
0 CLS:PRINT"SET UP LABELS AND PR
INTER NOW!":FORQ=1TO2000:NEXT:IN
PUT"DATE";X$:INPUT"MILEAGE";M$:I
NPUT"NEW OIL FILTER Y/N";F$:INPU
T"NEW PLUGS Y/N";P$:PRINT#-2,"OI
L CHANGE/DATE "X$:PRINT#-2,"MILE
AGE="M$:PRINT#-2,"OIL FILTER-"F$
:PRINT#-2,"PLUGS-"P$
```

Wayne Shipp
St. Charles, MO

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

DISK
$44.95

NEW

Introducing The "Super Smart"

DATA PACK II

TERMINAL COMMUNICATIONS SOFTWARE

Also Supports The PBJ 80 Column "Word Pak", Deluxe RS-232 Pak, Parallel Printer Card and PBJ 2SP Pak

NEW

TAPE
$34.95

28-64x24 Hi-Resolution Display

64K Support Up To 55K Text Buffer

9 Unlimited Variable Length Macro Key Buffers

BUFFER EDITOR Insert, Delete Change or Add To Buffer

"FEATURES"

- No Lost Information When Using Hi-Resolution Display On Line
- ASCII Compatible File Format
- Full Text Buffering
- Terminal Baud Rates 300 to 9600
- Automatic Word Wrap Eliminates Split Words
- Full/Half Duplex
- Automatic File Capture
- Programmable Word Length, Parity and Stop Bits
- Save and Load Text Buffer and Program Key Buffers to Tape or Disk
- 9 Hi-Resolution Display Formats, 28 to 255 x 24
- True Upper/lower Case Display
- Kill Graphics Option for an Extra 6K
- Supports Line Break
- Freeze Display and Review Information On Line
- Send Files Directly from Buffer or Disk
- Full Disk Support for Disk Version
- Send Control Codes from Keyboard
- Separate Printer Baud Rates 110-9600
- Display on Screen or Output Contents of Buffer to Printer
- Automatic Memory Sense 16-64K
- 9 Programmable Function Key Variable Length Macro Buffer
- Programmable Prompt Character or Delay to Send Next Line
- Programmable Control Character Trapping
- Programmable Open/Close Buffer Characters
- Automatic Key Repeat For Editing
- Program and Memory Status Displays

"The Source"

has arrived!

The Source brings the cost of Disassembler and Assembler Source code generation down to Earth.

Now you can Disassemble Color Computer machine language programs and generate beautiful, Assembler Source Code for a fraction of the cost of other Disassembler/Source Generator programs.

The Source has all the features and functions you are looking for in a Disassembler.

- Automatic label generation.
- Allows specifying FCB, FCC and FDB areas.
- Disassembles programs directly from Disk.
- Supports multiple origin disk files.
- Output complete Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler compatible source files directly to disk.
- Generated source files are in standard ASCII format that can be edited by most word processors.
- Built in Hex/Ascii dump/display to help locate FCB, FCC and FDB areas in a program.
- Fast Disassembly mode for testing & checking FCB, FCC and FDB mapped areas.
- Built in Disk Directory and Kill file commands.
- Menu display with single key commands for smooth, Easy, almost foolproof operation.

32K Disk $34.95

Starship Falcon

Graphics Adventure Game

Six months ago a terrorist group demanded to be designated the rulers of Alpha Sigma III, under the threat of world starvation on the planet Earth. The Federation denied their demands, so they released a biological weapon which has destroyed all known edible plant species from throughout the known galaxy. To date no plant life has been able to survive on Earth. Recently, Federation undercover agents have reported a story told by a roving space trader, of a planet with abundant edible plant life. These plants have a reputation of being able to survive in all climates and in fact, are supposed to grow at an incredible rate. The Federation is desperate! If Earth's food source is not replaced soon, the Federation will have to evacuate all animal and Human life. Your mission is to go to the planet Zephyr and obtain the seed of these plants and return to Earth. Several Federation agents have been sent to obtain the seeds and none has returned! Can you get the seed and survive??? GOOD LUCK!

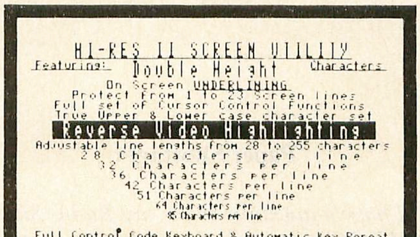
32K Disk $21.95

HI — RES II SCREEN UTILITY

NEW IMPROVED VERSION

- *UP TO 85 CHARACTERS PER LINE READABILITY*
- *ADJUSTABLE AUTOMATIC KEY REPEAT*
- *PROPTECT 1-23 SCREEN LINES*
- *CONTROL CODE KEYBOARD*

- FULLY BASIC COMPATIBLE
- DISPLAY FORMATS OF 28 to 255 CHARACTERS PER LINE
- FULL 96 UPPER/LOWER CASE CHARACTERS
- MIXED GRAPHICS & TEXT OR SEPARATE GRAPHIC & TEXT SCREENS
- INDIVIDUAL CHARACTER HIGHLIGHTING
- REVERSE CHARACTER HIGHLIGHT MODE
- WRITTEN IN FAST MACHINE LANGUAGE
- AUTOMATIC RELOCATES TO TOP OF 16/32K
- AUTOMATICALLY SUPPORTS 64K of RAM WITH RESET CONTROL
- REVERSE SCREEN
- ON SCREEN UNDERLINE
- DOUBLE SIZE CHARACTERS
- ERASE TO END OF LINE
- ERASE TO END OF SCREEN
- HOME CURSOR
- BELL TONE CHARACTER
- HOME CURSOR & CLEAR SCREEN
- REQUIRES ONLY 2K OF RAM
- COMPATIBLE WITH ALL TAPE & DISK SYSTEMS



```
HI-RES II SCREEN UTILITY
Featuring:   Double Height   Characters
On Screen UNDERLINING
Protect From 1 to 23 Screen lines
Full set of Cursor Control Functions
True Upper & Lower case character set
Reverse Video Highlighting
Adjustable line lengths from 28 to 255 characters
28 Characters per line
32 Characters per line
36 Characters per line
42 Characters per line
51 Characters per line
64 Characters per line
85 Characters per line

Full Control Code Keyboard & Automatic Key Repeat
Mixed Text and Graphics in PMODE 4 and Much More.

All Functions are easily programmable thru BASIC
Fully BASIC COMPATIBLE including CLS & PRINT @
```

$24.95 TAPE **$29.95** DISK

ALL ORDERS SHIPPED FROM STOCK
ADD $2.50 POSTAGE

Screen Enhancement Program Comparison Chart

PROGRAM FEATURES	HI-RES II NEW	HI-RES I OLD	BRAND X
Upper/Lower case characters	Yes	Yes	Yes
Mixed Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Biack	Buff/Black	Buff/Black
X.Y Coordinate Cursor Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	No
16.32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatability	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	$24.95	$19.95	$29.95

Circle Reader Service card #335

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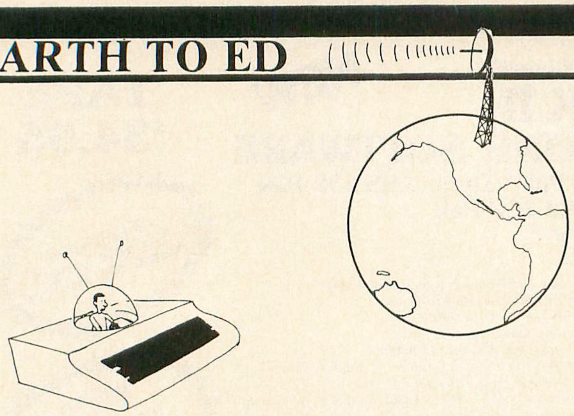

Slowly Going Bananas

By Ed Ellers
Rainbow Technical Writer

• *I just bought a Gorilla Banana dot-matrix printer and I can't get it to print with the CoCo. The operating light comes on, the print head moves back and forth for two seconds, but I can't get it to list my programs, etc. I have the Tandy 4-pin to 25-pin RS-232 cable.*

Also, the printer has a ROM socket on the circuit board. What's it for?

Bob Hart, Jr.
Alton, IL

The Radio Shack cable you mentioned (catalog number 26-3014) is wired for use with modems, and printers require a different hookup. Since the plug body is molded onto the connector on the 25-pin (DB25) end you won't be able to rewire it, so make a new cable using a 4-pin DIN plug, a DB25 connector (solder-pot type) and a length of four-conductor telephone wire. Check the printer manual to find out what pins are used for data input, printer ready and signal ground, and connect the cable as follows:

DIN Plug	DB25
1	not used
2	printer ready
3	signal ground
4	data in

The ROM socket you mentioned is probably reserved for additional code to provide more or different features.

Microfloppy Mysteries

• *I am going to buy a disk drive. Do I need a power supply? Do I need a disk controller? Will an Amdek double-disk drive work with a CoCo without the controller or power supply? When I buy programs on disk will they be furnished on the smaller disks?*

Dean B. Rice
North East, MD

You do need the disk controller no matter what kind of drives you use. A power supply, however, needs to be bought separately only if you buy a "bare" drive, that is, just a drive without the power supply or case. The Amdek Amdisk-III system will work on the CoCo with any of the "standard" controllers; it has its own power supply. If you get the Amdek, I recommend buying one regular 5¼-inch drive, since very little software is sold on the small disks. The Amdisk-III can be ordered with a cable that connects one standard drive as Drive 0; the 3-inch compact floppy drives act as drives 1 and 2.

Paper Shortages

• *I have a question about my Radio Shack DMP-200 printer. Is there a way to stop the out-of-paper from working? The printer stops printing about two inches from the bottom of a sheet, needing a press of the Restart button for each additional line. It would be much more convenient to print several more lines before this happens.*

Lee Deuell
Shell Rock, IA

Many printers have a DIP switch you can set to disable this feature; check your printer manual for details. If you don't have this, you can locate the switch (it's just before the platen [roller] where the paper enters the mechanism) and put a piece of tape over it to hold it down.

Sequential Logic

• *The documentation I received with my CoCo 2 and disk drive led me to believe that the proper power-up sequence is to turn on the computer first, followed by any peripherals. In* THE RAINBOW *and in some software documentation there are comments that make me believe the reverse is preferred. Why the difference?*

Daniel W. Beighley
Schofield, WI

I really don't know. Actually, it doesn't matter in what order you fire up your system — except for the Multi-Pak Interface, if you have one — this must be turned on before the computer.

Video Visions

• *I would like to be able to interface my video camera to the CoCo so I can print a video picture on my printer. Is there a piece of hardware out there that will enable me to do this?*

Kenneth B. Coblin
Vancover, British Columbia

This is done with a video digitizer cartridge. Computize, GRAFX and The Micro Works are three firms that make digitizers for the CoCo. These will also let you digitize images from TV programs, video tapes and disc (if you have the right equipment).

(Ed Ellers, a RAINBOW *and* PCM *staff member, is a self-confessed electronics fanatic whose other interests include science fiction.)*

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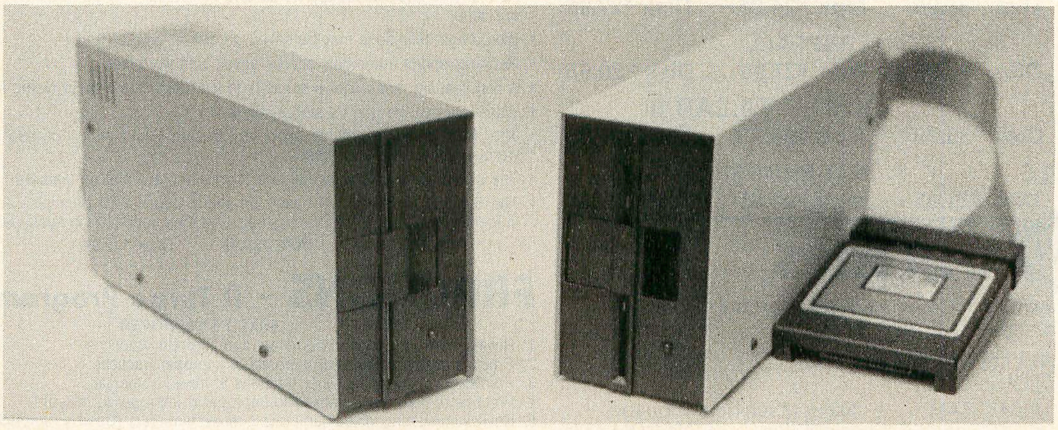

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GAMES

THE SAILOR MAN

TAPE $29.95
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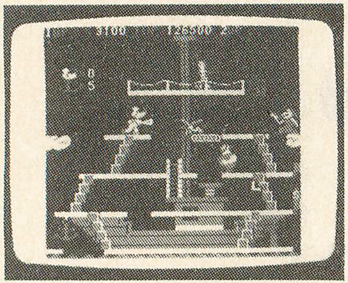
The first screen objective is to catch enough of Elsie's kisses (those Red Heart Shaped Things) to fill in the squares on the Sailorman's house. If you can time your punch just so, you can send the punching bag over to knock the bucket down and, with a little bit of luck, right on **Bigfatbadguy's** head. This will give you a little (but not much) time to catch all those RHSTs.

You must avoid contact with **Bigfatbadguy** who is actively pursuing you. You must also be careful of **Olduglyseawoman** who will appear at higher difficulty levels to chuck empties at you. Either avoid the flying bottles or punch them (with the fire button) to keep from being knocked into the water.



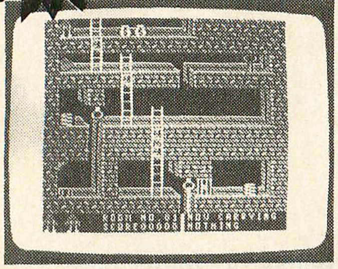
The second screen objective is to collect enough notes to play Elsie a little love song. You may jump off and onto the other end of **Fatguyeatinghamburger's** teetertotter to fly up a deck and even two decks if you manage to catch hold of **Smartaleckkid's** grab handles. Time it right and away you go.

The Third screen objective is to collect enough letters (thrown by Elsie's cries for H-E-L-P) to complete a ladder all the way to the crow's nest where Elsie is calling you. Beware of the Crow, however, who thinks you are after her eggs!

On all screens, eating a can of collard greens (labeled "S" for Collard and grasped by punching the can just right) will give you amazing speed, strength and ability and allow you to send **Bigfatbadguy** into the drink with a single punch.

NEW!

DRAGON SLAYER



Save the villagers of Pendor! They live in fear of Icarus, the blood thirsty dragon. The dragon lives in a cave, way up in the mountains. The cave is a treasure chest, full of gems and cashbags. The trail to the cave is as menacing as Icarus himself. You will have to secure the necessary equipment to climb the rocks and cross the rivers and chasms along the way. Be on the lookout for enemies and barriers at all times.

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EDUCATIONAL

FACTPACK

FACTPACK is a set of 3 programs designed for home or school use. The programs provide drill and practice with basic addition, subtraction, multiplication and division facts and are appropriate in grades 1-6. Each program requires a 32K Extended BASIC Color Computer. Disk drive and printer are optional.

Requires 32 K Ext. Basic Tape $24.95 Disk $29.95

TEACHER'S DATABASE II

Teachers' Database (TDB) is a program designed to allow a teacher to keep a computerized file of information about his/her students.

The program requires a 64K Color Computer and at least one disk drive. This completely revised program includes all of the capabilities of the original TDB plus many new features.

- Information on as many as 100 students, or more, may be in the computer at one time.
- Each student may have as many as 20, or more, individual items of data in his/her record.
- The program has many easy to follow menus.
- Records may be easily changed, deleted, or combined.
- Information about students may be numerical or text.
- Records may be quickly alphabetized or reordered based on their contents.
- Records may be sored by various criteria.
- A full statistical analysis of scores may be done and sent to the printer.
- Student test scores may be weighted, averaged, changed to a percentage or changed to a letter grade.
- Individual student progress reports and class gradebook sheets may be printed.
- Three methods of data entry spped the task of typing in student grades and test results.
- The program may be easily customized to work with any printer.
- Student seating charts may be created and printed.
- Graphs of student test results may be created using the computer's high resolution graphic screen.
- Grade distribution can be displayed numerically or as a histogram.

Requires 32K Ext. Basic Tape $39.95 Disk $42.95

VOCABULARY MANAGEMENT

Requires 16K Ext. Basic or 32K for printer output.

The Vocabulary Management System (VMS) is a series of programs designed to aid a parent or teacher in helping children to learn and practice using vocabulary and spelling words. The 11 programs that comprise the VMS include a full feature data entry/edit program, three printer output programs and 5 vocabulary/spelling game programs. The system's many outstanding features include:

- As many as 300 vocabulary words and definitions may be in the computer's memory at one time.
- Words and definitions may be saved on disk or tape.
- Remarks and/or comments can be saved with word files.
- A disk loading menu allows students to load disk files without typing file names.
- Word lists may be quickly alphabetized.
- The three printer segments allow you to create and print individualized tests, puzzles, word-searches and worksheets.
- The printer segments allow full use of your printer's special features.
- The 5 game programs are based on sound educational principles and provide practice in identifying words and matching them with their definitions in a fast-paced set of activities.

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1. Definitions of terms and review of finding equivalent fractions.
2. Practice finding equivalent fractions.
3. Practice finding sets of equivalent fractions.
4. Review of dinding if one fraction is equal to, not equal to, less than or greater than another.

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1. Review of placing fractions into lowest terms by dinding the greatest comon factor (GCF) of the numerator and denominator.
2. Practice finding the GCF of pairs of numbers.
3. Practice placing fractions into lowest terms by finding the GCF of the numerator and denominator.

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MATH DUEL is a challenging mathematics game that pits you against the computer in a game of wits. You must use all of your knowledge of factors, multiples and prime numbers to develop a strategy that allows you tog ather more numbers and thus more points than the computer.

The game is deceptively simple. you select the size of the playing field that is composed of from 8 to 100 numbers. You must then choose numbers that will give you the maximum number of points and the computer the least number of points. There are only 6 rules.

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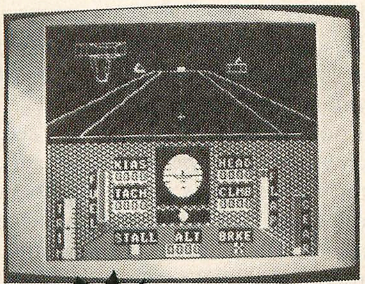

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

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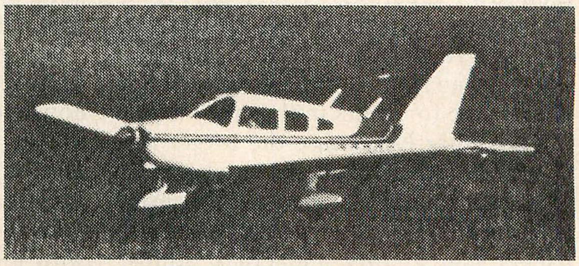
DISK $34.95



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Screen Pokes Made Easy

By Bill Bernico

One of the things computer enthusiasts like to do is trade original programs with other hackers. Why not? They're proud of their own creations. Every so often, after your program has made the rounds it finds its way back to you, and upon listing it, someone has substituted their name for yours in the credit lines!

That's partly because the forger figured it would never get back to you and partly because you made that line easily accessible! I realize an experienced hacker can modify and crack almost anything; I can't help you there. However, the people who switch credits are doing it because they probably don't know that much about programming their own original material. These are the people I can help you with.

Leaving your name right out in plain sight is tempting, but hiding it in POKE statements discourages anyone from modifying it. The procedure is simple enough if you know the meaning of the numbers being poked.

First, think about how text looks on the screen. Second, think about how it gets there via the PRINT @ statements. Third, familiarize yourself with the text screen in terms of POKE positions, and last, know which POKE values correspond with the characters you want on the screen.

Let's look at step one. Mentally arrange the text screen, or even write it down to see how it will look. Table 1 shows that for every PRINT @ position, there is a corresponding POKE position. Instead of the screen positions starting at zero and ending with 511, as it does with PRINT @, the POKE screen starts with 1024 and ends with 1535 — still 511 positions.

The screen presentation in Table 1 is a result of both methods. You can use the procedure in *SCRNPOKE* or the procedure in Listing 3 to get the same results. Listing 3 is a lot shorter, but is more easily tampered with (decide if your text is important enough to hide before choosing either method).

Step two asks us to think about how the text got there using PRINT @ statements. In this case, Line 20 of Listing 2 says PRINT @ 195, "sCREEN pOKES mADE eASY. To put that same text on the screen using POKE statements, we first have to know the screen positions and what values go there. You can glance quickly at Table 2 or use the method in Listing 1. Either will show the correct POKE value for the character wanted. With this in mind, we can see that instead of starting to PRINT @ 195, we will poke values starting at position 1219 and continue poking up to position 1240, a total of 22 pokes, *including blank spaces*.

Looking at Table 2, we can see how each value corresponds with each character. These values are the numbers that show up in the DATA statements: three lines — three DATA statements. We could have poked each one individually, but that takes up more space.

Another point I want to touch on has to do with special inverse characters. While it's true you can create *some* of these screen pokes using PRINT @ statements, some special inverse characters can only be accessed by poking them into screen locations. For example, you can SHIFT 0 to get inverse letters, but to get inverse numbers, 1985 for example, you have to poke the four values into the screen. Inverse 1 = POKE value 49, 9 = 57, 8 = 56 and 5 = 53. The same is true for characters like the percent sign, quotation marks, colons, etc.

The last point I'd like to make has to do with the last screen position, number 1535. If you PRINT @ 511, the screen will scroll up. It won't if you poke that same

---

(Bill Bernico is a self-taught computerist who enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wis.)

Table 1

ADD THESE VALUES TO EITHER METHOD

PRINT @	POKE	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
0	1024																																
32	1056																																
64	1088																																
96	1120																																
128	1152																																
160	1184																																
192	1216						S	C	R	E	E	N		P	O	K	E	S		M	A	D	E		E	A	S	Y					
224	1248									B	Y		B	I	L	L		B	E	R	N	I	C	O									
256	1280												(	C	)		1	9	8	5													
288	1312																																
320	1344																																
352	1376																																
384	1408																																
416	1440																																
448	1472																																
480	1504																																

Table 2

PV=POKE Value CHR=Character

INVERSE								NORMAL							
PV	CHR	PV	CHR	PV	CHR	PV	CHR	PV	CHR	PV	CHR	PV	CHR	PV	CHR
0	@	16	P	32	■	48	0	64	@	80	P	96	□	112	0
1	A	17	Q	33	!	49	1	65	A	81	Q	97	!	113	1
2	B	18	R	34	"	50	2	66	B	82	R	98	"	114	2
3	C	19	S	35	#	51	3	67	C	83	S	99	#	115	3
4	D	20	T	36	$	52	4	68	D	84	T	100	$	116	4
5	E	21	U	37	%	53	5	69	E	85	U	101	%	117	5
6	F	22	V	38	&	54	6	70	F	86	V	102	&	118	6
7	G	23	W	39	'	55	7	71	G	87	W	103	'	119	7
8	H	24	X	40	(	56	8	72	H	88	X	104	(	120	8
9	I	25	Y	41	)	57	9	73	I	89	Y	105	)	121	9
10	J	26	Z	42	*	58	:	74	J	90	Z	106	*	122	:
11	K	27	[	43	+	59	;	75	K	91	[	107	+	123	;
12	L	28	\	44	,	60	<	76	L	92	\	108	,	124	<
13	M	29	]	45	-	61	=	77	M	93	]	109	-	125	=
14	N	30	↑	46	.	62	>	78	N	94	↑	110	.	126	>
15	O	31	←	47	/	63	?	79	O	95	←	111	/	127	?

character into position number 1535. Keep this in mind if you want to use `PRINT @` with a `FOR/NEXT` loop to put a border around your text screen. `PRINT @` every border location *except* number 511. Leave it blank and fill it in with `POKE 1535,xx` (`xx` being the character that matches the rest of the border).

I hope this will be of some help to programmers. If there are any further questions you'd like answered concerning screen pokes, send them to me at 708 Michigan Ave., Sheboygan, WI 53081. Please include an SASE. ☐

Listing 1: `TITLPOKE`

```
10 CLS
20 FOR X=1219 TO 1240
30 READ A
40 POKE X,A
50 NEXT X
60 FOR Y=1285 TO 1299
70 READ B
80 POKE Y,B
90 NEXT Y
100 FOR Z=1350 TO 1357
110 READ C
120 POKE Z,C
130 NEXT Z
140 DATA 19,67,82,69,69,78,143,
         16,79,75,69,83,143,13,
         65,68,69,143,5,65,83,
         89
150 DATA 2,89,143,2,73,76,76,
         143,2,69,82,78,73,67,79
160 DATA 104,67,105,143,113,
         121,120,117
```

Listing 2: `DEMOPOKE`

```
10 CLS
12 PRINT@9,"screen pokes
14 FOR X=0 TO 255
16 PRINT@96,"EXAMPLE: POKE 1297,
";X
18 PRINT@192,"POKE VALUE";X;
20 PRINT@224,"INTO SCREEN
22 PRINT@256,"POSITION 1297 ->
24 PRINT@305,"^ TO GET THIS
26 PRINT@483,"HIT ANY KEY FOR NE
XT VALUE";
28 POKE 1297,X
30 EXEC 44539
32 NEXT X
```

Listing 3: `TITLPRNT`

```
10 CLS
20 PRINT@195,"sCREEN pOKES mADE
eASY
30 PRINT@261,"bY bILL bERNICO
40 PRINT@326,"(C) 1985
```

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26-5104 Tandy 2000 1 Dr. 10 Meg H.D. 256K	3950.00	1885.00
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26-1209 CCR 82 Tape Recorder	49.95	42.00

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VIP Integrated Library	149.95	139.00
RADIO SHACK Software	—	15% Off
Tom Mix Software	—	CALL
Comrex SS/DD 10 Pack Disks	21.00	14.00

PRINTERS

	LIST PRICE	OUR PRICE
Epson LX-80 Printer (Friction Feed)	$ 299.00	$ 250.00
Epson LX-80 Tractor Feed	49.95	40.00
OKIDATA 182 Printer	299.00	245.00
STAR SG-10 Printer	299.00	250.00
C.ITOH 7500 Prowriter Printer	289.00	225.00
Botek Serial to Parallel Interface	59.00	49.00

MONITORS

	LIST PRICE	OUR PRICE
Comrex 12" Green Monitor	$ 119.00	$ 95.00
Comrex 12" Amber Monitor	129.95	110.00
Comrex 13" Color Monitor	329.95	285.00
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— Debbie Hartley

21792

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

RACK UP IN *DOUBLE BACK*

Scoreboard:

There is a way to obtain more than one million points in *Double Back*.

Try to stay in the corner and go out to circle all immobile objects, including yo-yos and skating shoes. This way you can circle a maximum of 19 objects, for a score of around 108,000 points. A fast moving 'X' will appear after 10 death's-heads are on the screen.

Also, one way to catch a yo-yo is to make half a circle below, wait until it rolls in and then close the circle.

Diane Guernon
Montreal, Quebec

DANGER BEGINS WITH AN 'M'

Scoreboard:

I have a couple of hints for *Star Blaze*. When you lose your shields, it is dangerous to press 'M' and look for an unoccupied repair station; the aliens could blow you away at any moment. If you press 'W' as soon as you lose the shields, you will be sent to a random, unoccupied sector where you can safely find a repair station. The same thing can be done with fuel or torpedoes.

While you are "warping," the aliens can't kill you but you can kill them. This is a golden opportunity to watch the radar and rapidly shoot at the aliens.

Doug Rostad
Saskatoon, Saskatchewan

FRUSTRATED

Scoreboard:

Possibly the most infuriating game for the Color Computer is the program *Strip Tease*, by Britt Monk. Frustrated owners of this program may allow the young lady to complete her performance with a `POKE &H33AC,&H13`. This address assumes the program has been loaded to the addresses of 1E00, 380F and 37EA.

Frank W. Hampshire
Fostoria, OH

SELF-INDUCED SICKNESS

Scoreboard:

Now that I have solved *Bedlam*, I would like to give some tips for people who are still stumped.

In order to keep the green key (found in the electric shock room), you must get shot with the hypodermic needle so when you type in `GET GREEN KEY` you will get right out of there. You'll have to try this a couple of times because the sickness doesn't always take you west.

If poisoning the dog doesn't work, try getting Napoleon into the room with the secret door and ask him to open it.

Jeff Sooey
Ponte Vedra Beach, FL

READY FOR TAKE OFF

Scoreboard:

Here is an easy way to have a successful flight on the *Worlds of Flight* Simulation.

First, choose a course that is free of any obstacles. One such course is World 5 north to World 2.

Take off from World 5 and level off at about 30 feet. Fly to VOR 1, then turn to a heading of 15 degrees. After entering World 2, descend to 12 feet using the flaps. Line up with the runway the best you can, then turn to VOR 1 for a true heading and descend to six feet. When you are over the threshold, maintain a 60-foot descent.

I hope this works for you as it has for me.

Brant Putnam
Tucson, AZ

A BREATH OF AIR

Scoreboard:

Here are a few hints I have found for *Sea Dragon*. When you reach the master mine, go up for air before you start to shoot. This, and frequent trips to the surface for more air, will help you in two ways. 1) When at the surface, the turret at the top stops firing at you. This gives you a good chance to rest, since only one turret is firing. 2) The more air you get, the better. Always get a full load before diving. This will allow you more time at the shields. Also, when firing at the shields, move around a lot and hold the fire-button down. This totally decimates the shield and confuses the turrets. I have confronted and destroyed the master mine on every level and have found no use for the torpedoes that fire upward.

Also, I need some help with *Shenanigans*. How do you get past the muggers? What is the beer for? How do you get out of jail? How do you open the window in the hall? All help would be appreciated.

Charles Farris
Schinveld, The Netherlands

Scoreboard:

Here are some tips for *Brewmaster*: When the cowboys' or pirates' backs are turned they will still take beers. Also, when you are at the top-most table, if you move up you will end up on the botton table and vice versa.

Also, here are some tips for the game *Zaxxon*: When you get to the second fortress, the altitude for the force shields is 1) 5, 2) 1, 3) 5, 4) 0 and 5) 3.

Cory McKay
Montreal, Quebec

To respond to other readers' inquiries and requests for assistance, reply to Scoreboard Pointers, c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all Scoreboard readers in an upcoming issue.

— Debbie Hartley

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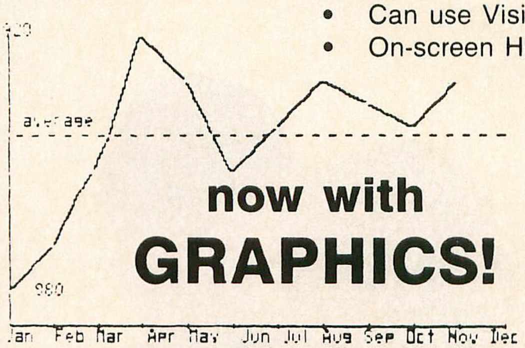

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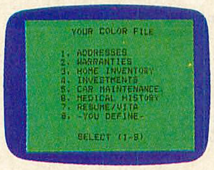

```
YOUR COLOR FILE

1. ADDRESSES
2. WARRANTIES
3. HOME INVENTORY
4. INVESTMENTS
5. CAR MAINTENANCE
6. MEDICAL HISTORY
7. RESUME/VITA
8. -YOU DEFINE-

SELECT (1-8)
```

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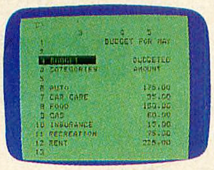

```
                      BUDGET FOR MAY

 BUDGET                 BUDGETED
 CATEGORIES             AMOUNT

 AUTO                     175.00
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```

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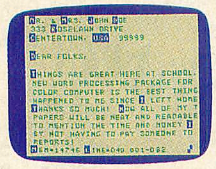

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BY NOT HAVING TO PAY SOMEONE TO
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```

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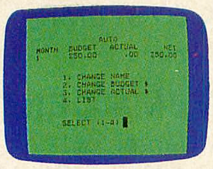
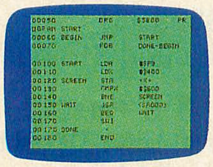


```
               AUTO
MONTH  BUDGET    ACTUAL      NET
1      250.00       .00   250.00

    1. CHANGE NAME
    2. CHANGE BUDGET $
    3. CHANGE ACTUAL $
    4. LIST

    SELECT (1-4)
```

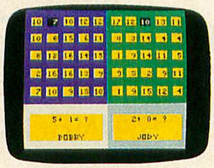
Color Editor/Assembler. Develop 6809 software. You get trial assembly in memory, an editor to change your program and Z-Bug for testing. #26-3250 39^{95}



```
00050              ORG     $3800
00060 BEGIN        JMP     START
00070              FDB     DONE-BEGIN

00100 START        LDA     #$FF
00110              LDX     #$400
00120 SCREEN       STA     ,X+
00130              CMPX    #$600
00140              BNE     SCREEN
00150 WAIT         JSR     [$A000]
00160              BEQ     WAIT
00170              SWI
00175 DONE         EQU     *
00180              END
```

Bingo Math.* Three exciting games to make learning math fun. Bingo, Speed Math and Number Hunt. #26-3150 19^{95}



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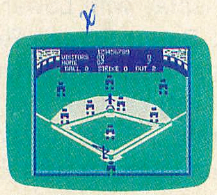

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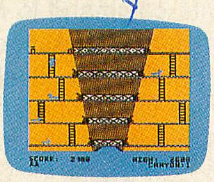

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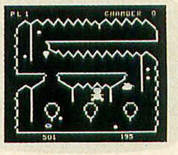

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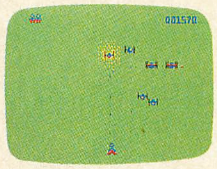

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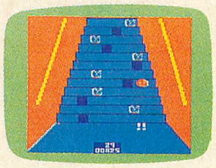

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** Cassette recorder required.
*** Joysticks and recorder required.

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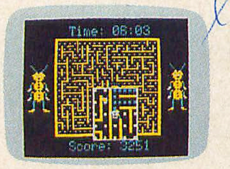

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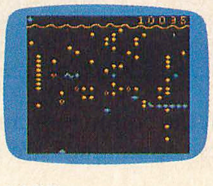

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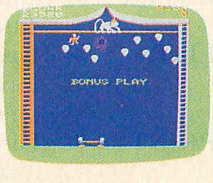

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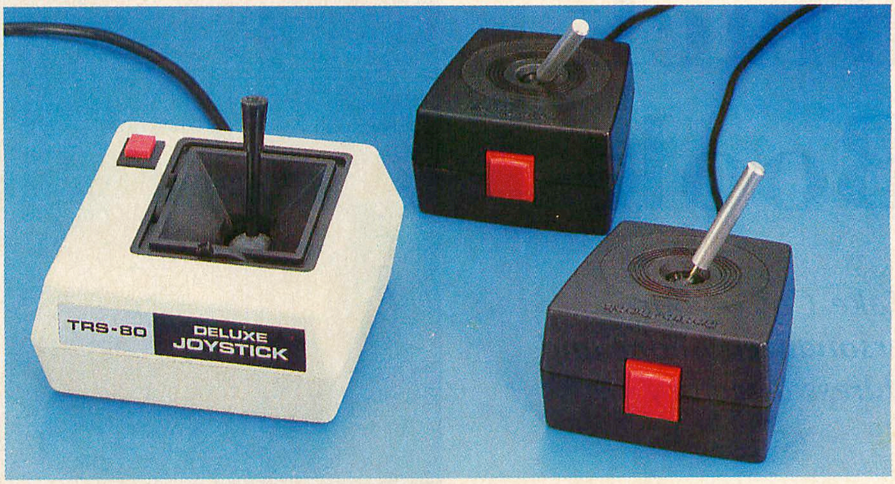

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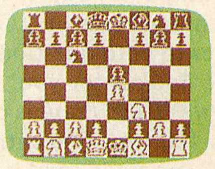

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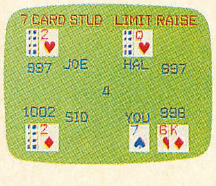

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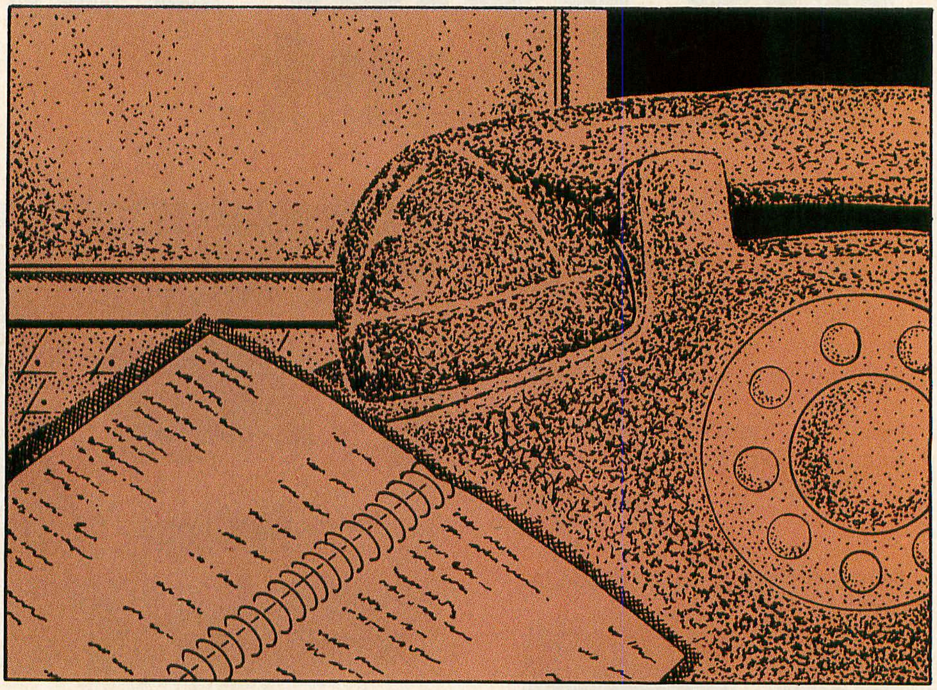
By Eric Hartley



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To get maximum usage from *Little Black Book*, first familiarize yourself with the commands and their functions. These commands are as follows:

HELP — List commands and give brief summary
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PRINT — Display formatted data on printer
FORMAT — Choose what part of the file is to be displayed
EDIT — Edit specific entry
SEARCH — Search for specified string in file
SAVE — Save program and data as one on tape
DEL — Delete specific entry (requires password)
INIT — Initialize Data File (requires password)

All of the commands are self-explanatory, except EDIT. The instructions for this command are: 1) Enter *all* of the name line, 2) If data is correct, press ENTER and 3) If change is desired, type line with changes and press ENTER. ☐

(Eric Hartley is a sophomore at Tennessee High School in Bristol, Tenn., and has been programming for three years. His hobbies are computer programming and electronics engineering.)

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The listing: LBLKBOOK

```
10 PCLEAR 6
20 POKE 27,&H72
30 POKE 28,&H01
40 CLEAR 1000
50 DIM F(4)
60 F(1)=1:F(2)=1:F(3)=1:F(4)=1
70 ZZ=0
80 PT=00
90 PR=00
100 PS$="BLACK" 'PASSWORD FOR
   INIT & DEL
110 GOTO 160
120 A$=STRING$(128,0)
130 A=VARPTR(A$)
140 POKE A+2,INT(PT/256):POKE A+
3,PT-(INT(PT/256)*256)
150 RETURN
160 ST=&H4000
170 ED=&H7200
180 CLS
190 PRINT " little black book"
200 PRINT " COPYRIGHT 1984 BY"
210 PRINT "    ERIC HARTLEY"
220 PRINT
230 REM *CMD LEVEL*
240 LINE INPUT ":";C$
250 IF C$="" THEN 230
260 CN=00
270 IF C$="INIT" THEN CN=1
280 IF C$="ENTER" THEN CN=2
290 IF C$="LIST" THEN CN=3
300 IF C$="PRINT" THEN CN=4
310 IF C$="FORMAT" THEN CN=5
320 IF C$="DEL" THEN CN=6
330 IF C$="SAVE" THEN CN=7
340 IF C$="EDIT" THEN CN=8
350 IF C$="SEARCH" THEN CN=9
360 IF C$="HELP" THEN CN=10
370 IF CN=00 THEN PRINT "SYNTAX
ERROR":GOTO 230
380 ON CN GOSUB 410,520,790,970,
1010,1170,1460,1700,1520,1970
390 PRINT
400 GOTO 230
410 PRINT "ENTER CLEAR CODE"
420 LINEINPUT "#";CD$
430 IF CD$<>PS$ THEN PRINT "not
accepted":RETURN
440 CLS
450 PRINT "NOW CLEARING $XXXX"
460 FOR I=ST TO ED STEP 128
470 POKE I,00 'NULL
480 PRINT @ 14,HEX$(I)
490 NEXT I
500 PRINT "initailize complete"
510 RETURN
520 PRINT "ENTER NAME"
530 LINEINPUT N$
540 PRINT "STREET ADDRESS"
550 LINEINPUT A1$
560 PRINT "CITY,STATE ZIP"
570 LINEINPUT A2$
580 PRINT "PHONE NUMBER"
590 LINEINPUT PH$
600 CLS
610 PRINT "SEARCHING FOR SPACE A
T $XXXX"
620 FOR I=ST TO ED STEP 128
630 A=PEEK(I)
640 PRINT @ 24,HEX$(I)
650 IF A=0 THEN PRINT "FOUND" :G
OTO 680
660 NEXT I
670 PRINT "NO SPACE":RETURN
680 N$=N$+STRING$(32-LEN(N$),32)
690 A1$=A1$+STRING$(32-LEN(A1$),
32)
700 A2$=A2$+STRING$(32-LEN(A2$),
32)
710 PH$=PH$+STRING$(32-LEN(PH$),
32)
720 X$=N$+A1$+A2$+PH$
730 FOR Q=I TO I+127
740 P=ASC(MID$(X$,Q-(I-1),1))
```

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- **WORD PROCESSOR** – merge database with custom letters, labels, & reports
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```
750 POKE Q,P:PRINT CHR$(P);
760 NEXT Q
770 PRINT
780 RETURN
790 CLS:PR=0
800 I=ST
810 IF I=ED THEN PRINT "COMPLETE
":RETURN
820 IF PEEK(I)=0 THEN PRINT :PRI
NT "COMPLETE":RETURN
830 PT=I
840 GOSUB 120
850 A1$=MID$(A$,1,32)
860 A2$=MID$(A$,33,32)
870 A3$=MID$(A$,65,32)
880 A4$=MID$(A$,97,32)
890 IF F(1)=1 THEN PRINT #PR,A1$
;
900 IF F(2)=1 THEN PRINT #PR,A2$
;
910 IF F(3)=1 THEN PRINT #PR,A3$
;
920 IF F(4)=1 THEN PRINT #PR,A4$
;
930 PRINT #PR
940 IF PR=0 THEN FOR DL=1 TO 300
:NEXT DL
950 I=I+128:GOTO 810
960 RETURN
970 CLS
980 IF (PEEK(&HFF22) AND 1)=1 TH
EN PRINT @ 0,"PRINTER NOT READY"
:GOTO 980 ELSE PRINT @ 0,"NOW PR
INTING"
990 PR=-2
1000 GOTO 800
1010 CLS
1020 PRINT "FORMAT DISPLAY"
1030 PRINT
1040 PRINT "NAME (Y/N) :";:GOSUB
 1110
1050 F(1)=M
1060 PRINT "ADDRESS (Y/N) :";:GO
SUB 1110
1070 F(2)=M:F(3)=M
1080 PRINT "PHONE NUMBER (Y/N) :
";:GOSUB 1110
1090 F(4)=M
1100 RETURN
1110 M$=INKEY$:IF M$="" THEN 111
0
1120 IF M$="Y" THEN M=1
1130 IF M$="N" THEN M=0
1140 IF M$<>"Y" AND M$<>"N" THEN
 1110
1150 PRINT M$
1160 RETURN
1170 LINE INPUT "CLEAR CODE:";CD
$
1180 IF CD$<>PS$ THEN PRINT "not
 accepted":RETURN
1190 PRINT
1200 PRINT "ENTER NAME AS IT APP
EARS IN LIST";
1210 LINEINPUT N$
1220 N$=N$+STRING$(32-LEN(N$),32
)
1230 CLS
1240 PRINT "NOW SEARCHING $XXXX"
1250 FOR I=ST TO ED STEP 128
1260 PRINT @ 15,HEX$(I)
1270 IF PEEK(I)=00 THEN PRINT "n
o match":RETURN
1280 PT=I:GOSUB 120
1290 IF MID$(A$,1,32)<>N$ THEN N
EXT:PRINT "no match":RETURN
1300 CLS
1310 PRINT A$
1320 PRINT "FOUND...."
1330 PRINT "ARE YOU SURE?";
1340 A$=INKEY$:IF A$="" THEN 134
0 ELSE IF A$<>"Y" THEN RETURN EL
SE PRINT "Y"
1350 CLS
1360 PRINT "ONE MOMENT PLEASE"
1370 PRINT "STACK MODIFY $XXXX"
1380 FOR AX=I+128 TO ED
1390 PRINT @ 46,HEX$(AX)
1400 AZ=PEEK(AX):POKE AX-128,AZ
```

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```
1410 IF AX>=ED-127 THEN POKE AX,
0
1420 IF PEEK(AX)=0 THEN 1440
1430 NEXT AX
1440 PRINT "finished"
1450 RETURN
1460 CLS
1470 PRINT "PREPARE TO SAVE"
1480 PRINT "PRESS REC & PLAY, TH
EN ENTER"
1490 IF INKEY$<>CHR$(13) THEN 14
90
1500 CSAVE "BLK BOOK"
1510 RETURN
1520 CLS:ZX=00
1530 PRINT "ENTER STRING FOR SEA
RCH"
1540 PRINT " (ENTER TO RETURN)"
1550 LINEINPUT ":";X$
1560 IF X$="" THEN RETURN
1570 CLS
1580 PRINT "SEARCHING DATA"
1590 FOR I=ST TO ED STEP 128
1600 POKE 1039,PEEK(I)
1610 IF PEEK(I)=0 THEN PRINT "CO
MPLETE":GOTO 1660
1620 PT=I:GOSUB 120
1630 IF INSTR(A$,X$)<>0 AND ZZ=1
 THEN RETURN
1640 IF INSTR(A$,X$)<>0 THEN GOS
UB 1680:ZX=ZX+1
1650 NEXT I
1660 PRINT "NUMBER OF OCCURENCES
:"ZX:RETURN
1670 PRINT "not found":RETURN
1680 PRINT A$
1690 RETURN
1700 CLS
1710 ZZ=1:GOSUB 1520:ZZ=00
1720 IF X$="" THEN RETURN
1730 IF INSTR(A$,X$)=0 THEN PRIN
T "not found":RETURN
1740 QQ=I
1750 PT=I:GOSUB 120
1760 NA$=MID$(A$,1,32)
1770 A1$=MID$(A$,33,32)
1780 A2$=MID$(A$,65,32)
1790 PH$=MID$(A$,97,32)
1800 PRINT "NAME"
1810 PRINT NA$;
1820 LINE INPUT N$:IF N$="" THEN
 N$=NA$
1830 PRINT "ADDRESS"
1840 PRINT A1$;
1850 LINEINPUT A3$:IF A3$<>"" TH
EN A1$=A3$
1860 PRINT "CITY,STATE ZIP"
1870 PRINT A2$;
1880 LINEINPUT A4$:IF A4$<>"" TH
EN A2$=A4$
1890 PRINT "PHONE NUMBER"
1900 PRINT PH$;
1910 LINEINPUT P$:IF P$<>"" THEN
 PH$=P$
1920 N$=N$+STRING$(32-LEN(N$),32
)
1930 A1$=A1$+STRING$(32-LEN(A1$)
,32)
1940 A2$=A2$+STRING$(32-LEN(A2$)
,32)
1950 PH$=PH$+STRING$(32-LEN(PH$)
,32)
1960 GOTO 720
1970 CLS
1980 PRINT "COMMANDS ARE:"
1990 PRINT "ENTER-ENTER LISTING"
2000 PRINT "INIT-INITIALIZE DATA
 password"
2010 PRINT "FORMAT-SET PRINT FOR
MAT"
2020 PRINT "DEL-DELETE RECORD pa
ssword"
2030 PRINT "SAVE-SAVE FILE"
2040 PRINT "EDIT-EDIT ENTRY"
2050 PRINT "SEARCH-SEARCH FOR SP
ECIFIC      STRING"
2060 PRINT "HELP-THIS MENU"
2070 RETURN
```

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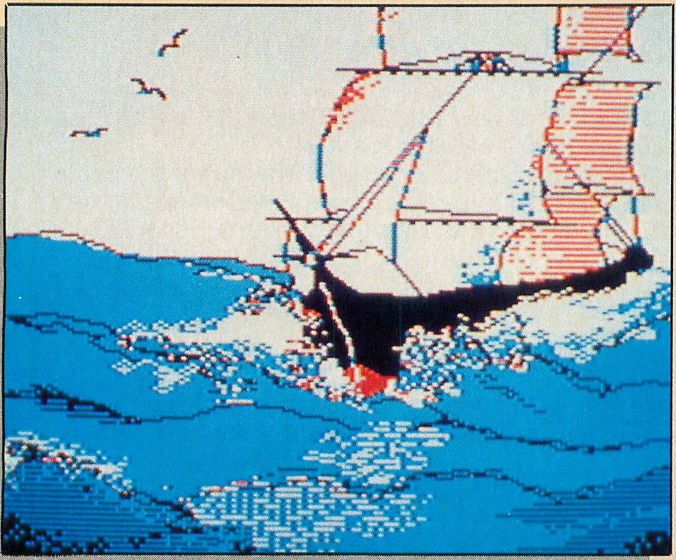
The CoCo Gallery

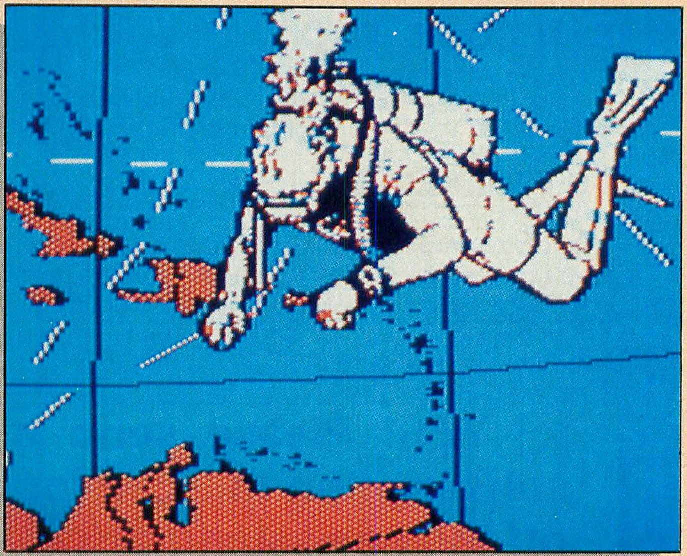


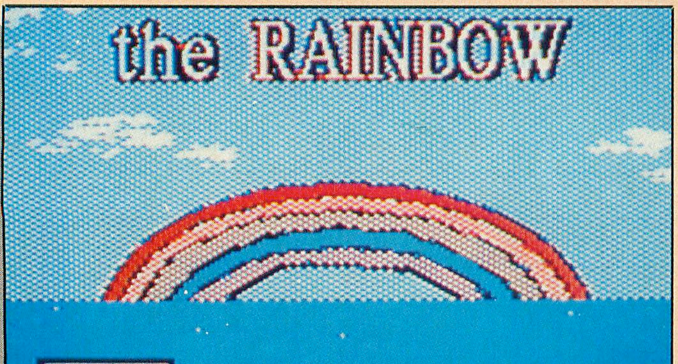
1st PRIZE

Philip Newton
Ship at Sea
November's Gallery leads off with this blue-ribbon offering, which was drawn using a BASIC program Philip wrote, evocative of the pilgrims' journey to the New World. Philip lives in Cleveland, Tenn.

2nd PRIZE

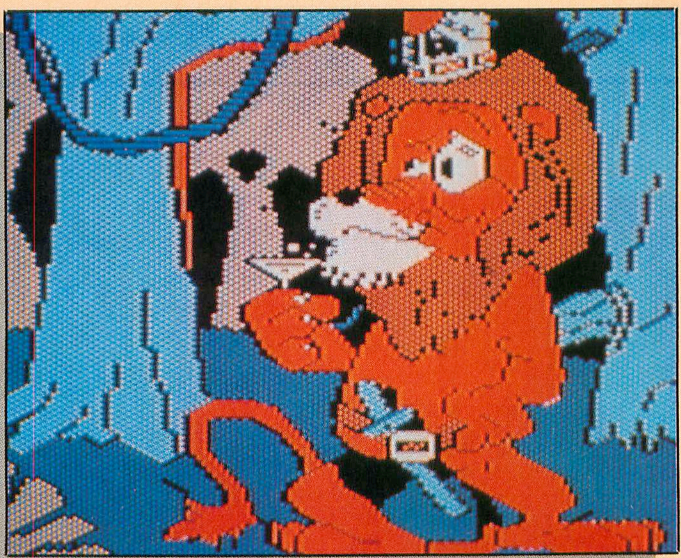
Eric White
Scuba
Eric continues our theme with this beautifully detailed depiction of humankind's ongoing love affair with the sea. Eric lives in Altamonte Springs, Fla., and used *Graphicom I* and *II* for this picture.





3rd PRIZE

Steve Hartford
The Rainbow Ocean
Steve tickled us with his clever seaside sign and oceanic representation drawn using *CoCo Max*. Steve lives in Glendale, Calif., and completes our prize winning November Gallery.



HONORABLE MENTION

Christine Dufour

Majestor

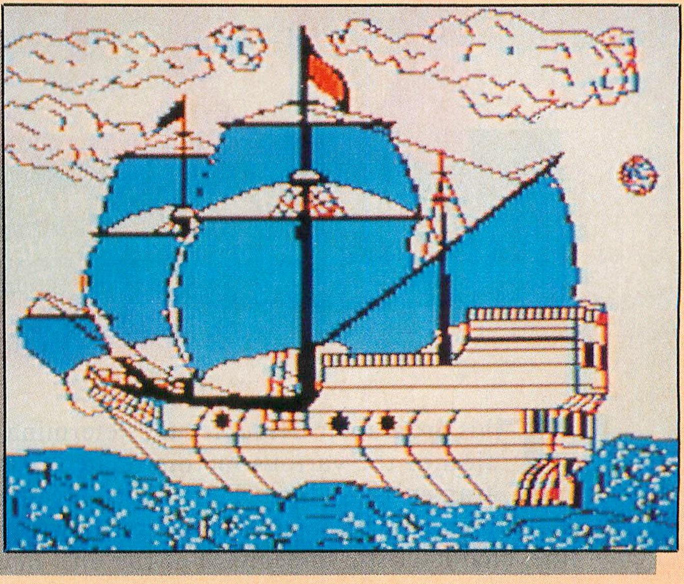
Christine lives in Cacouna, Quebec, and used *Graphicom II* for this picture with feline of a royally good time — and we're not lion.

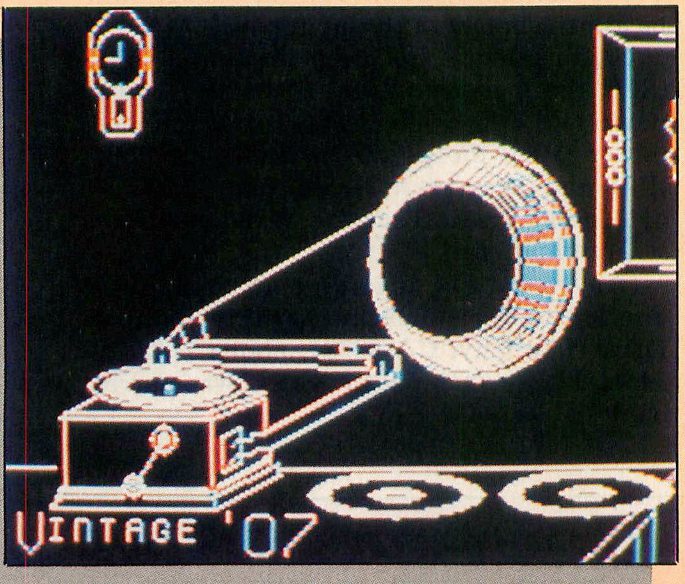
HONORABLE MENTION

Mark Werdin

Ship

Although Mark lives near the Mission Mountains of Montana, his submission to RAINBOW shows a natural rapport with the sea and the vessels upon it. Mark used *Graphicom I* and *II*.





HONORABLE MENTION

C.W. Harriman

Outside Horn Phonograph

C.W. used BASIC `LINE`, `DRAW` and `CIRCLE` commands for this charming still life. C.W. lives in Bradford, Mass., and collects old phonographs.

SHOWCASE YOUR BEST!

You are invited to nominate original work for inclusion in upcoming showings of CoCo Gallery. Share your creations with the CoCo Community!

Be sure to send a cover letter with your name, address and phone number detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere.

We will award a first prize of $25, a second prize of $15 and a third prize of $10. Honorable mentions also will be given.

Send your entry on either tape or disk to:
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THE RAINBOW
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Attn: Monica Dorth

COAX

For the Ham radio buff, this program determines your transmission line losses

By Irvin L. McNally

This program provides for the determination of the various factors related to a transmission line. The inputs are the input power, the length of the transmission line, characteristic impedance of the line, line attenuation at the desired frequency and the measured SWR at the input to the line. Using 100 as the input power (PI), the answers will be as percentages of the input power.

Coax computes and prints the output SWR (SO), the load resistance (ZR), the forward power (FP), the load power (PL), the reflected power (PR), the power to a matched load (PM) and the losses in Db due to the presence of standing waves. The program is completely self-prompting.

(Any questions regarding *Coax* may be directed to Mr. McNally at 26119 Fairlane Drive, Sun City, CA 92381, phone 714-679-3456. Please include an SASE when writing.) ☐

(Mac McNally lives in Sun City, Calif., and holds a bachelor's degree from the University of Minnesota. He was an electronics officer in the U.S. Navy and retired after 25 years of service. His amateur extra class call is K6WX.)

65 237
180 86
END 103

The listing: COAX

```
5 PRINT#-2, "DETERMINATION OF FA
CTORS FOR A GIVEN LENGTH OF TRAN
SMISSION LINE, CHARACTERISTIC IM
PEDANCE, LINE ATTENUATION AT THE
 DESIRED FREQUENCY AND THE MEASU
RED SWR AT THE INPUT TO THE TRAN
SMISSION LINE."
10 PRINT "WHAT IS THE INPUT POWE
R? EXPRESS AS 100 AND THE ANSWER
S WILL BE AS PERCENTAGES OF THE
INPUT POWER."
15 INPUT "ENTER"; PI
20 PRINT#-2, PI "INPUT POWER (PI
)."
25 PRINT "WHAT IS THE IMPEDANCE
OF THE COAX OR TRANSMISSION LINE
?"
30 INPUT "ENTER"; ZO
35 PRINT#-2, ZO "IMPEDANCE (ZO)
OF COAX OR TRANSMISSION LINE."
40 PRINT "WHAT IS THE LENGTH OF
```

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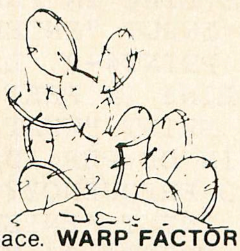

NEW

HALL OF THE KING

This program combines all the things you look for in a great two disk graphics adventure program. The Hi-Res graphics are superbly done. The text portion of the screen and the graphics change quickly as you move through the **HALL OF THE KING.** You can move freely from one portion of the adventure to another. Call up your inventory at any time. You can even save or load a game at ANY time. **HALL OF THE KING** will challenge even the most seasoned adventurer.

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HALL OF THE KING requires 64K EB and one disk drive. This exciting two disk adventure comes packaged in a vinyl library case. **$39.95**

WARP FACTOR X

If you have been waiting for a game for your color computer that has everything, your wait is over. **WARP FACTOR X** is here. This all graphics simulation game requires strategy, fast thinking, an eye for detail, and above all experience in knowing the capabilities of your starship and its computer. You will begin your adventure into space as a cadet but your ultimate goal is to become Captain of the Enterprise. To do this you must neutralize the enemy planets and eliminate the Klingon starbases along with the Klingons themselves.The Klingon is not a "Robot." He has the same capabilities as your starship but he is also subject to the same problems. You will find that he is inclined to move around while you are attacking him and may even chase you when you find it prudent to retreat. You must form alliances with neutral planets and bring them into the federation. Many of the planets will have special resources which will help the federation.

WARP FACTOR X was written by an engineer for the Kennedy Space Center and has been three years in the making. You will appreciate the attention to detail and complex inner workings of the program. The program is supported by eight pages of documentation important to the success of your mission. Your progress through the eighteen sectors of the galaxy will be recorded and saved for your next adventure into space. **WARP FACTOR X** includes versions for 32K, 64K, and COCO 2. It requires one disk drive and comes packaged in a vinyl library case. **$34.95**

NEW

DR. WHO

DR. WHO is a graphics program based on Britains' number one longest running television series, "Doctor Who". As the game begins you are in control of the Tardis, a time machine disguised as a police call box, and you must find and recover the seven keys to time. To accomplish this feat you will travel around the Galifry Solar System from planet to planet. You must find each planet, fight you way through aliens, and land on each planet. The difficulty level increases with each planet. **DR. WHO** is a real time game. No matter what you are doing energy is being consumed and planets are moving in orbit. All controls and commands are entered through the keyboard. Move your Tardis through the galaxy as you search for far away planets and battle aliens in you quest for the seven keys of time. Your ultimate reward, however, lies out beyond the stars. Requires 32K. **Tape — $24.95; Disk — $29.95**

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```
THE LINE IN FEET (L)?"
45 INPUT "ENTER"; L
50 PRINT#-2, L "LENGTH (L) OF TH
E LINE IN FEET."
55 PRINT "WHAT IS THE ATTENUATIO
N IN DB PER 100 FEET AT THE DESI
RED FREQUENCY?"
60 INPUT "ENTER"; X
65 PRINT#-2, X "ATTENUATION (X)
IN DB PER 100 FEET AT THE DESIRE
D FREQUENCY."
70 A=L*X/100
75 PRINT#-2, A "MATCHED LOAD ATT
ENUATION (A) OF LINE IN DB."
80 PRINT "WHAT IS THE SWR AT THE
 INPUT TO THE LINE (SI)?"
85 INPUT "ENTER"; SI
90 PRINT#-2, SI "INPUT SWR (SI).
"
95 M=SI-1
100 N=SI+1
105 Q=N/M
110 R=A/10
115 T=10^R
120 U=T+Q
125 SO=U*(1/(Q-T))
130 PRINT#-2, SO "SWR AT OUTPUT
(SO)."
135 ZR=ZO*SO
140 PRINT#-2, ZR "LOAD RESISTANC
E (ZR)."
145 S=ZR/ZO
150 C=(S-1)/(S+1)
155 G=EXP(-.46*A)
160 H=EXP(-.23*A)
165 J=C^2
170 PF=PI/(1-(J*G))
175 PRINT#-2, PF "FORWARD POWER
(PF)."
180 PL=(1-J)*H*PI/(1-(J*G))
185 PRINT#-2, PL "LOAD POWER (PL
)."
190 PR=PF-PI
195 PRINT#-2, PR "REFLECTED POWE
R (PR)."
200 PM=PI/10^(A/10)
205 PRINT#-2, PM "POWER TO A MAT
CHED LOAD (PM)."
210 LA=4.343*LOG(PM/PL)
215 PRINT#-2, LA "ADDITIONAL LOS
S IN DB DUE TO PRESENCE OF STAND
ING WAVES."
220 LT=A+LA
225 PRINT#-2, LT "TOTAL LOSS IN
DB IN THE PRESENCE OF STANDING W
AVES."
230 PRINT#-2, "PROGRAM PREPARED
FOR TRS-80C BY K6WX."
```

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What hardware products do you plan to buy this year?

☐ More Memory
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◆ Lists and totals entries by account, for a month or the whole year.

◆ Lists and totals entries by payee or income source, for a month or the whole year.

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◆ Prints a spreadsheet showing activity by account and month for the whole year (seeing this one is believing).

◆ Flags deductible expenses.

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◆ Sorts entries by date.

◆ Stores your data to tape or disk.

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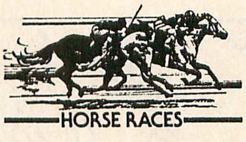
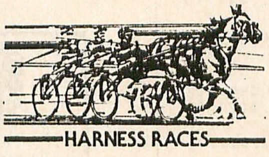

HORSE RACES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Corrections

"MAIL09" (June, July and August 1985): Tim Harris tells us there was a mistake in Listing 10 (PROCEDURE alterentry) in the August issue. On Page 246, this listing runs down to the end of the page but is not yet finished; the rest of Listing 10 is found on Page 247 at the end of Listing 11 (PROCEDURE addtolist). Listing 11 goes down to the line numbered 034B where an `END` statement is found; the rest of the listing up to the start of Listing 12 is really the end of Listing 10.

The end of Listing 10 should actually read as follows:

```
04BA      ENDIF
04BC      INPUT "New address 2        : ",tempname
04DA      IF tempname <> "*" THEN  label.address2:= tempname
            .
            .
            .
0602      END
```

Tim also passed on a CRC table for the modules in his program. After PACKing the source files into I-code, you can use the OS-9 *IDENT* utility to find the CRC value for each packed module. Here are the reference values.

mainmenu	132	$22	$271845
mail09	132	$22	$60F105
clearscreen	132	$22	$903457
entryerror	132	$22	$BDE403
getindex	38	$22	$F4B5AD
printlabel	133	$22	$A04427
inputdata	129	$22	$E45A21
updatelist	133	$22	$489BF1
printlist	132	$22	$17EBC9
displaylist	132	$22	$D7DF77
mailsort	131	$22	$485A32
xchange	133	$22	$D2ED30
findentry	129	$22	$54E018
createlist	129	$22	$F0E4BB
addtolist	35	$22	$4CFAE5
alterentry	35	$22	$74B2B4
deleteentry	42	$22	$4BC806
outputlist	42	$22	$E12DB1
makelabels	131	$22	$3984E9
onelabel	131	$22	$3093F2
shellcommand	35	$22	$54B498

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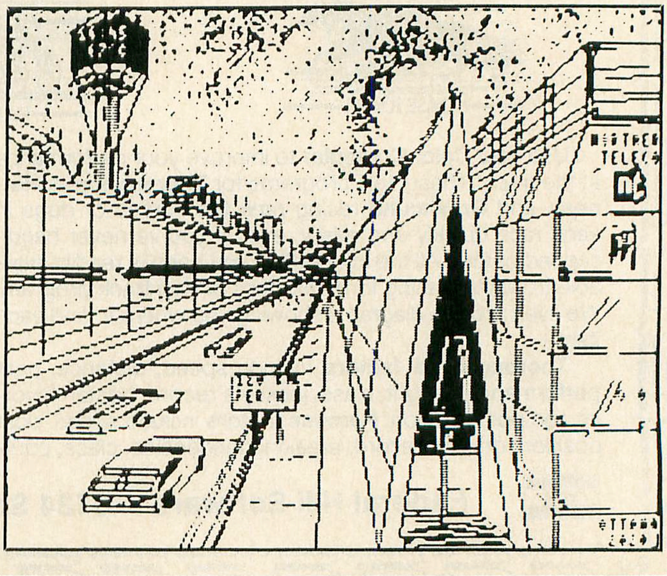
"Scan It And Understand It With Rapid Reading" (July 1985, Page 129): T.C. Taulli tells us there have been reports of BS (Bad Subscript) Errors in his program. He recommends changing Line 170 to read:

```
170 CLS3: FOR XX=1 TO 500:NEXT
```

"The Great Rainbow Simulation Package" (July 1985, Page 47): Carlos Santiago writes that there is an error on Page 70 in Line 5842 of Listing 2, `WORLDWAR`. The value -1 actually represents "Defend Current Position," and -2 represents "Remain Neutral." To correct this, change Line 5842 to read as follows:

```
5842 PRINT"INPUT NEW GOAL FOR TH
E            ";Y$(C);" TROOPS":PR
INT" -1 = DEFEND CURRENT POSITIO
N    -2 = REMAIN NEUTRAL
       0 TO 12 = INVADE THAT REGI
ON"
```

"CoCo Gallery" (October 1985, Page 173): Due to a printing error, the October CoCo Gallery entry from Ray Larabie, "Street Scene," appeared in reverse. Here is the correct version, and the judges of CoCo Gallery wish to apologize to Ray.



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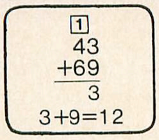

```
 1
 43
+69
  3
3+9=12
```

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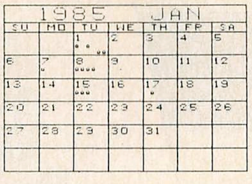

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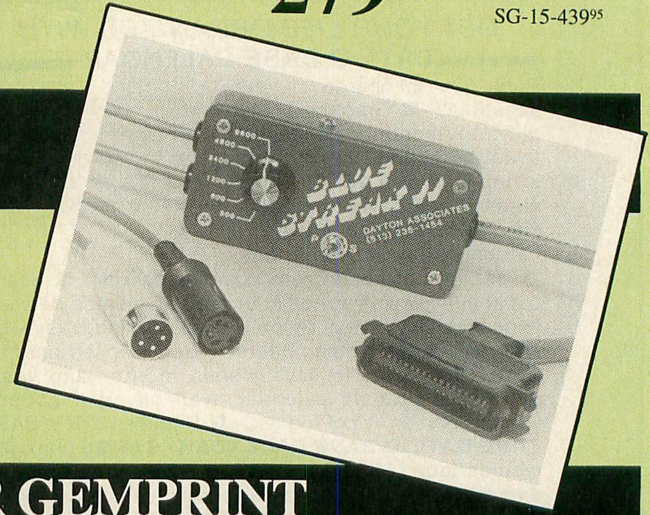

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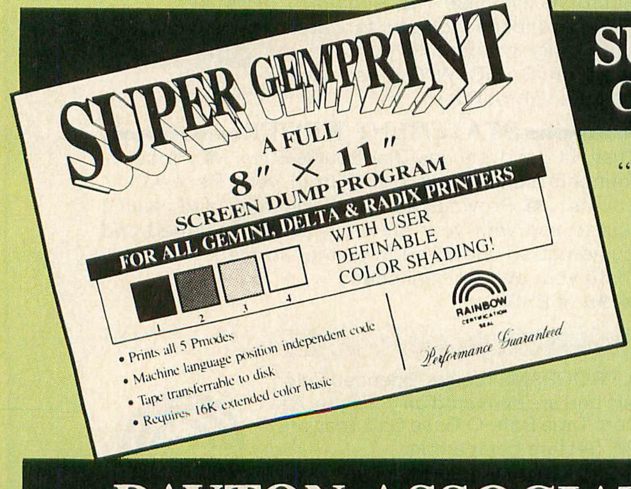

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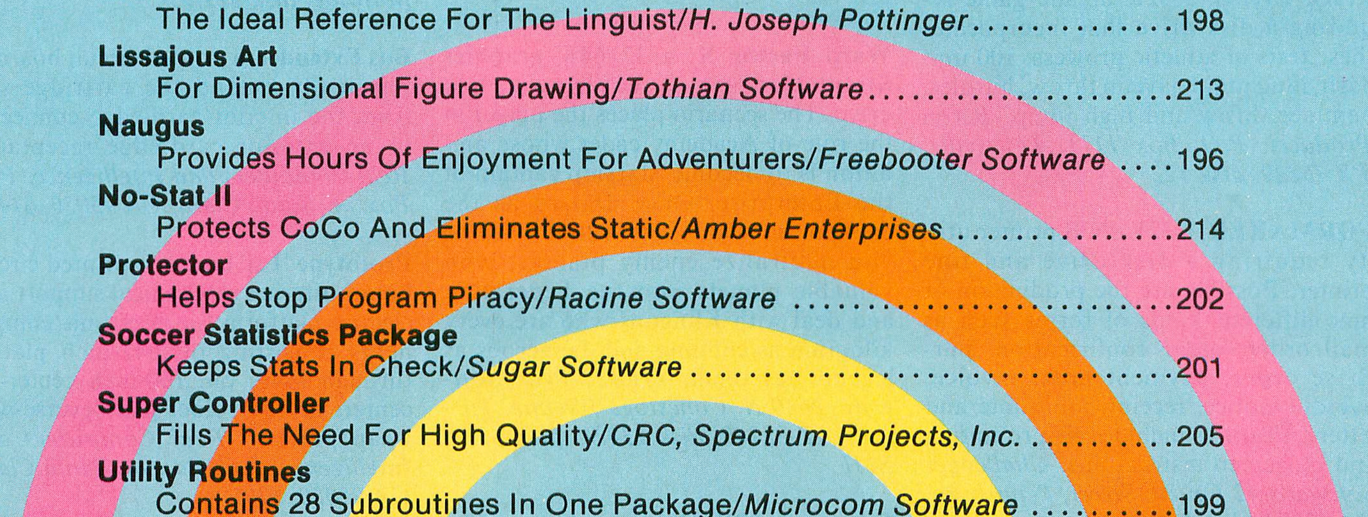

RECEIVED & CERTIFIED

The following products recently have been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

Barbarossa, a 64K war game depicting the war in Russia in 1941 through 1944. The player (as German forces) must contend with blunders from high command, weather and critical supply factors. Parallels with history are possible but the game was designed to allow creation of new events rather than duplicating history. *Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, cassette $30.95, disk $33.95*

The Font Shop, a 64K printer utility that allows users to edit and compile a BASIC program to load an Okidata Microline 92, 93 or 84 with an alternate character set, which can be called through software using simple printer codes. On a Hi-Res screen, the user moves about a grid using the arrow keys and sets pixels with the ENTER key to design specific characters. It is necessary to specify which printer is owned when ordering. *Atmospheres, 1207 Eighth Avenue, Brooklyn, NY 11215, cassette or disk $29.95 plus $3 S/H*

Track Events, a 32K arcade game requiring a disk drive that incorporates these tests of athletic prowess: 100 unit dash, long jump, javelin throw, hurdles, hammer throw and high jump. *Baron Products, P.O. Box 1111, Lewisville, TX 75229, disk $22*

FORMAKER, a 32K ECB printer utility requiring a disk drive and line printer. Possible are the production of nine different kinds of forms such as mail order, order confirmation, purchase order, payment note, invoice, overdue notice, receipt, job quote and letters. Features include self-prompting and on-screen instructions. *Challenger Software, 42 Fourth Street, Pennsburg, PA 18073, disk $49*

Prereader Pictures, a 32K ECB educational program designed for children between 1 and 5 years of age. Hi-Res graphics pictures appear of objects along with corresponding songs at the press of certain letter keys. Children learn to associate the letter key with their favorite songs and pictures. *Co-Co-Nut Software, Site 9, Box 1, R.R. #2, Tofield, Alberta, Canada T0B 4J0, cassette $14.95*

TX Word Processor, a 64K program requiring a disk drive to allow users a way to arrange a form or letter on an 80-column by 66-line page by using the screen as a 32 by 15 window. Included are automatic functions such as Key Repeat and Carriage Return with Word Carry. *Kolesar B/S, 7 Ladd Road, Westfield, PA 16950, disk $12.95 plus $2 S/H*

ABC Puzzle, a 64K ECB game requiring a disk drive. There are 15 tiles that are lettered and one empty space; players must rearrange the board in order by sliding adjacent tiles up, down or across. *Mikaron Software Company, P.O. Box 1064, Chester, CA 96020, disk $10*

Warp Factor X, a 32/64K graphics Simulation game, requiring a disk drive. The scenario places the player in the role of Academy cadet whose ambition is to become Starship captain of the Enterprise. Once aboard as the captain, all your skills will be tried as you neutralize enemy planets, woo valuable planets into the Federation and deal with Klingons who are every kilogram as cunning and dangerous as legend has them. *Prickly-Pear Software, 2640 N. Conestoga Avenue, Tucson, AZ 85749, disk $34.95 plus $1.50 S/H*

Crystal, a 32K CoCo version of the oracle of the crystal ball requiring a disk drive. Crystal is an artificial intelligence program that inquires about you and six other people in your life. Based on answers given, predictions of likely events are indicated. *Prickly-Pear Software, 2640 N. Conestoga Avenue, Tucson, AZ 85749, cassette $24.95, disk $29.95 plus $1.50 S/H*

Dr. Who, a 32K graphics arcade game loosely based on British TV's popular series of the same name. The scenario of the game places the player in control of Tardis, a time machine disguised as a police call box. The player must find and recover the seven keys to time. *Prickly-Pear Software, 2640 N. Conestoga Avenue, Tucson, AZ 85749, cassette $24.95, disk $29.95 plus $1.50 S/H*

CoCo Incognito, a 25-page reference guide to PEEKs, POKEs, EXECs, ML subroutines and game hints and tips for Extended BASIC and Color BASIC Color Computers. Included are Memory Operation, BASIC and Extended BASIC keywords, Hi-Res graphics and 64 by 48 graphics pattern sheet. *RC Creations, 17251 Palatine N., Seattle, WA 98133, $7.95 plus $1.50 S/H*

Ghana Bwana, a 64K Adventure game requiring a disk drive. The scenario: You join Professor Chance, a.k.a. Ghana Bwana, on his hazardous quest for the Great Secret of the Erebus Island using skill and a quick wit to reach the treasure site. *Radio Shack stores nationwide, disk $29.95*

Bus Extender, a printed circuit board to physically extend the cartridge slot from the interior card-edge connector to an exterior card-edge receptacle. *Real Computers and Intelligence, P.O. Box 74, Santa Clara, CA 95050, $14*

Prototype 'Lsi' board, a printed circuit board offering mechanical support and electric platform for electronic components consisting of .042-inch plated-through holes on .100-inch center-to-centers in 'Lsi' solder-pad/reverse-wire wrap pattern. *Real Computers and Intelligence, P.O. Box 74, Santa Clara, CA 95050, $20*

Prototype 'P' board, a printed circuit board offering mechanical support and electric platform for electronic components consisting of .072-inch square pads with .042-inch plated-through holes in .100-inch center-to-center grid patterns. *Real Computers and Intelligence, P.O. Box 74, Santa Clara, CA 95050, $20*

CoCo Keyboard Cover, an upgraded replacement for REM Industries standard cover with a five-color decal on the inside of the cover listing hints such as keyboard memory locations and Baud rates. *REM Industries, Inc., Dept. RM, 9420 B Lurline Avenue, Chatsworth, CA 91311, $9.95 plus $2.50 S/H*

Crossover, a 16K arcade game requiring joysticks and featuring a pause button and high score display. CoCo forms and moves lines and players must form lines of the same color to ram CoCo's lines before they cross over. *Rococo Software, 3019 Sylvester Drive, Hartland, WI 53029, cassette $14.95, disk $17.95*

Fighter Pilot, a 32K arcade game for joystick or keyboard operation featuring a "pause game" option. The scenario pits you against wave after wave of attacking aircraft trying to shoot you down as you manuever your fighter through the wild blue yonder. *Saguaro Software, P.O. Box 1864, Telluride, CO 81435, cassette $24.95, disk $29.95*

PIXGEN, a 64K ECB Adventure graphics generator that uses an ML graphics routine permitting users to draw with a joystick. Features include automatic compiling of ML programs needed to regenerate the pictures drawn and accessed by BASIC by performing a POKE and EXEC. *Spectacular Software, P.O. Box 363, Mansfield Center, CT 06250, cassette $27.95, disk $29.95 plus $2 S/H*

Colorcom/E, a 16/64K smart terminal program requiring a disk drive and a full duplex RS-232 compatible modem connected to the RS-232 port of the Color Computer. Features include Hi-Res (54 by 24) screen, 300/1200 offline printing and XMODEM support for downloading ML. *Spectrum Projects, Inc., P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, disk $39.95 plus $3 S/H*

OS9 Calligrapher, a special purpose text processor requiring a 64K and Color Computer OS-9 Version 01.01.00 and a dot-matrix printer capable of bit-image printing, since the letters are formed by firing the required combination of pins on the print head to obtain the desired results. Printers supported are: Epson, Gemini, Radio Shack DMP series, Okidata, Banana and Prowriter, or their equivalents. *OS9 Calligrapher* is suited for signs, flyers, invitations, diplomas, awards, certificates and labels. *Sugar Software, 1701 North 50th Avenue, Hollywood, FL 33021, disk $39.95 plus $1.50 S/H*

Business Bankbook Bank 7.1 & Bank 9.1, two 32/64K financial utilities to replace your business check register and print checks. Possible are the printing of monthly or yearly statements of your business transactions, list transactions by numbers the user assigns and list checks outstanding. *Bank 7.1 — System One* for one disk drive; *Bank 9.1 — System Two* for two disk drives. *Sunrise Software, 8901 N.W. 26th Street, Sunrise, FL 33322, Bank 7.1 disk $59.95 plus $2 S/H, Bank 9.1 disk $59.95 plus $2 S/H*

Computer Bankbook Book.5, a 32/64K financial utility to replace your check register and print your checks. Possible are the printing of monthly or yearly statements of your transactions, list transactions by numbers you assign and list checks outstanding. *Sunrise Software, 8901 N.W. 26th Street, Sunrise, FL 33322, disk $29.95 plus $2 S/H*

Perpetulife, a 16K two-player game combining familiar elements from checkers and Life. On the screen grid "cells" survive, die and are born according to specific rules. *Tothian Software, P.O. Box 663, Rimersburg, PA 16248, cassette $19.95*

CoCo Gardener, a 64K home utility to help plan the most efficient use of garden space. Possible are background information of the most popular garden vegetables, printouts of charts to show a reasonable sequence in which to plant the selected vegetables, how much space each row requires and shopping lists for the vegetables chosen. *Tothian Software, P.O. Box 663, Rimersburg, PA 16248, cassette $19.95*

Time Master, a 16K ECB CoCo calendar utility that will give the day of the week of any past, present or future date, print a calendar for specific months and give a biorhythm chart. Printer is optional, and almost any 80-column printer will do. *Tothian Software, Box 663, Rimersburg, PA 16248, cassette $19.95*

MEDIC, an 8/64K medical counselor requiring a disk drive. Categories covered include emergencies, digestive, heart, arthritis and childhood rashes with fevers. Counsel ranges from common sense home remedies to admonitions on when to seek professional help. *West Bay Company, Route 1, Box 666, White Stone, VA 22578-9765, disk $20*

RAINBOW
CERTIFICATION
SEAL

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW's reviewers for evaluation.

— Monica Dorth

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REVIEWING REVIEWS

COCO TALKER

Editor:

I would like to thank RAINBOW and Rick Rahim for his informative review of the *CoCo Talker* in the August 1985 issue on Page 218. I appreciate his comments and accept his congratulations with gratitude. I would, however, like to clarify some points if I may.

Rick mentioned that a version of the text-to-speech translator for other speech units is probably available from Computerware. The program when purchased from Computerware is specifically designed to be used with the Radio Shack Speech and Sound Cartridge. Similar programs are provided with speech units purchased from non-Tandy sources such as Speech Systems and Spectrum Projects. In fact, the *CoCo Talker* from Computerware and the Speech and Sound Translator from Speech Systems will allow you to use the many applications programs developed for the *VOICE* and *SUPER-VOICE* with the Tandy speech cartridge.

The concern in the review that there is not a list of phonemes in the package is easily explained. When you put down your bucks for a Tandy speech cartridge you get a nice 56-page user manual and there is an allophone list on pages 38 and 39. The *CoCo Talker* will also create allophone strings and send them to the screen or printer so you can see how the text-to-speech pronounces words. This feature, when combined with the allophone list in the manual, should help the average user concoct any pronunciation of any word possible.

I hope this information will be of help to those persons who have *CoCo Talker* or Speech and Sound Translator.

Frank Delargy
DEL Software

MLBASIC

Editor:

In response to the letter to the editor, written by Colin Sanderson [Reviewing Reviews, July 1985, Page 191] and concerning problems with compiling programs using the *MLBASIC* compiler, I would like to make the following comments.

The first program involving the `CHR$` function would not compile because of two reasons. The string variable, S$, needs to be declared in the beginning of the program before it can be used in a command. This is different from ordinary BASIC, stemming from the fact that *MLBASIC* does not dynamically allocate string space at the time the program is run. The trade-off is a decrease in string manipulation time by a factor of five. The `CHR$` function *is* recognized if used in a string expression. The distinction is that *MLBASIC* can manipulate a string variable two ways; either one character at a time or all characters at once (the way ordinary BASIC operates). The character '$' is used to distinguish which way to manipulate a string. The character must *precede* the string to be used if all of its characters are to be manipulated at once. The following example program is how the first program in Mr. Sanderson's letter should have read:

```
0 DIM S$(10):REM Declare S$ to
  be 10 characters long
10 $S$=CHR$(10)
20 PRINT#-2,$S$
30 END
```

In the second program of Mr. Sanderson's letter, the floating point variable is incremented by the constant 1.0. *MLBASIC* originally treated the number 1.0 as 1.00146484, as a routine contained in the compiler did not round off the insignificant digits. The compiler has been updated so that floating point constants appear as they should (1.0 now is 1.000000000).

I would like to thank THE RAINBOW for allowing the readers to see both viewpoints regarding our product, *MLBASIC.*

David Prey
Manager, Wasatchware

CYRUS

Editor:

After reading your review of *Cyrus*, Radio Shack's new chess program (August 1985 issue, Page 195), I was convinced that it was a dramatic improvement over the previous ROM Pak program (which was called simply *CHESS*).

Your reviewer admitted he was not an avid chess player and left unanswered the most important question regarding computer chess programs: How good a chess player is it? Fortunately, the answer is, "Quite good, thank you!"

I am currently looking forward to trying *Cyrus* against other chess programs that run on friends' computers. I feel that *Cyrus* should acquit itself well. The package says "world class chess" and it's not far wrong.

Drew Shorter
Cuyahoga Falls, OH

GOLF HANDICAPS

Editor:

I appreciated the very informative review of my *Golf Handicaps* program in the August 1985 issue of RAINBOW [Page 215]. However, there was one incorrect interpretation of the comments in the program. It does not take two to three minutes per player to compute their handicaps; instead, it takes about that long for the entire 50 players.

Don Hug
Roseville, CA

CC-100 Interface Breadboard Package: Interface CoCo With The Outside World

Roll up your sleeves and warm up your soldering iron. It's time to learn some basic interfacing techniques for the CoCo. Group Technology Ltd. has introduced the CC-100 Interface Breadboard Package that will provide you with the opportunity to learn how to interface your CoCo with the outside world.

The package consists of:

1) CC-100 Interface Breadboard;
2) RS-100 Modular IC Breadboard Socket;
3) CC-150 Experiment Component Package;
4) 21283 Book, *TRS-80 Color Computer Interfacing With Experiments.*

All of these items are top quality and are well-packaged.

The CC-100 Interface Breadboard is glass epoxy, double-sided, solder masked and tinned. It comes with 10 solderless sockets pre-attached to the board. These nifty sockets, which are connected to the CPU address and data lines via the CoCo expansion connector, allow you to connect various electronic components and circuits to the CoCo with ease.

The RS-100 Modular IC Breadboard Socket is attached to the interface board with two screws and provides the place to plug in a variety of IC chips, resistors and other goodies while conducting experiments.

The CC-150 Experiment Component Package contains a fist full of ICs, LEDs, resistors, capacitors and other components to be used with the experiments covered in the 203-page, soft-cover book.

This book, written by Andrew C. Staugaard, Jr., is very well-done and structured into six chapters ranging from the technical aspects of the CoCo and its theory of operation to fundamentals of microcomputer interfacing, as well as a series of hands-on experiments. *TRS-80 Color Computer Interfacing With Experiments* is one of the best books I've seen and is geared to the beginning experimenter. I conducted several of these experiments and was impressed with the scope and treatment of each.

While the CoCo-100 Package sells for $51.25, and in my opinion is a good deal, the CC-150 Component Package sells for $89.95, which I feel is too high. I believe most true-blue hardware hackers would agree with this assessment, however, it must be pointed out that unless you are willing to "shop around" for better deals, the convenience of having all the necessary components to conduct the experiments could be worth the higher price. Additionally, a 10 percent price break is available on the CoCo-100 package as opposed to buying each part separately as indicated here.

CoCo-100 Package includes:	$51.25
CC-100 Expansion Connector Board	34.95
RS-100 Modular IC Breadboard Socket	6.95
21893 Interface book and experiments	14.95
CC-150 Experiment Component Package	89.95

In addition to these prices, there is also a $2.50 shipping and handling charge on the CoCo-100 and CC-150 packages.

While I was impressed with the overall quality, performance and diversity of the experiments, please be forewarned. Do not attempt to conduct the experiments or otherwise use the expansion board if you do not have at least a basic knowledge of electronic circuits. If you're not sure of yourself, please study the subject before "smoking" your CoCo. Experiment on your toaster, instead! Have fun but be careful.

(Group Technology, LTD., P.O. Box 87, Check, VA 24072, Component package, $89.95, plus $2.50 S/H, Interface Board $51.25 plus $2.50 S/H)

— Jerry Semones

SOFTWARE

Color Computer MACHINE MONITOR - professional software and manuals published by R.C.I.
EDIT memory Content, TRACE program Instructions, TRAP data References, 3 display Formats.
Program distribution includes both [2K] CoCo-dependent and [4K] stand-alone Versions.
#10101/Tape = $14.45, #10102/Disk = $16.95; User Guide #20101/Small manual = $9.95

HARDWARE

Color Computer PCBoards, FR4, [4x8]", 40 Pin, gold plated Connectors, design by R.C.I.
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#30102/A Prototype "P", [3.5X6]" grid, .042" PTH, .1" spacing, 34 pin Connector = $20.00
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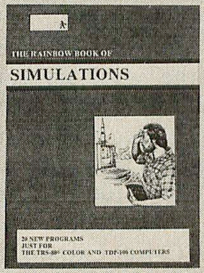
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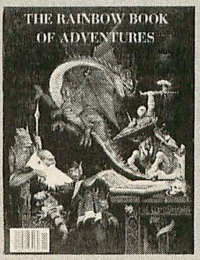

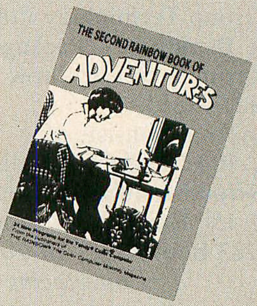

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The book that demystifies the state-of-the-art operating system for the Tandy Color Computer. Authors Dale L. Puckett and Peter Dibble show you how to take advantage of OS-9's multi-tasking and multi-user features, and the capability of redirecting input and output commands at will. An easy-to-read, step-by-step guide packed with hints and tips, tutorials and free software in the form of program listings.

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Cosmic Paint Features Excellent Documentation

Cosmic Paint is a graphics utility. When I received the package, I was anxious to boot up the program because graphics have always fascinated me (especially since I can make screen dumps to my printer and show them off). Well, *Cosmic Paint* let me down. It has one feature I have not seen in any other utility, but the program is limited.

Although the author made a valiant attempt, *Cosmic Paint* is awkward at best. Hats off, however, to Mr. Hattan (the author) on the documentation. Its reproduction is not of high quality, but every command is described in detail. Since the program uses icons (tiny pictures on the screen that represent a certain function), a screen dump is included with the explanation of each command. This makes understanding how the program operates much easier. The descriptions are well-written and easy to understand, and are complemented by an actual program that simulates *Cosmic Paint* and takes you step by step through a tutorial on how it works.

Cosmic Paint is written in BASIC with machine language subroutines. The sluggishness of BASIC becomes very apparent when using this program. Still, the author programmed it in an efficient manner.

It is really all of the little quirks in the program that turn me off. For starters, I have the old ROMs in my CoCo and when I first boot the program, the screen is cleared and I get an "OK." This is due to the `PCLEAR` bug in the ROM and is simply fixed by putting the command at the end of the program and branching to it with a `GOTO` statement. It is annoying to have to type `RUN` again after booting the system.

Next, since the program is in BASIC, the BREAK key will put a quick end to whatever you may be doing. A BREAK key disable takes one line in BASIC! Even if the BREAK key is disabled, it's still simple to crash the program. I have seen On-Error-Goto routines in THE RAINBOW; I use them all of the time. The point is, since *Cosmic Paint* lacks such a routine, the program will crash if you give it a wrong filename when performing disk input/output. An error routine would not even have been necessary if the program checked the directory first to see if a specified file exists. It is true that the manual gives instructions on how to recover from a crash, but I expect a program to be error-free.

The manual also states that the program will crash if the `PAINT` option is used "on a figure which is too complex." Drawing complex figures is the sole reason I use a graphics utility. This brings me to another problem. Because icons are used to select functions, only two-thirds of the actual graphics screen is shown at any one time (the other third displays the icons). This is no problem since one of the functions allows you to scroll the screen up or down; this allows access to a full graphics screen. The problem comes in when painting. The `PAINT` option paints everything on the screen, but it does not paint the undisplayed portion of the picture. This means when you scroll the picture down, there is a horizontal line where the painting stopped.

Cosmic Paint has many features fashioned after other utilities. These include rotation, text, magnification, mirroring, undo and different paint brushes and patterns. Most of these have some sort of problem (in my opinion). To begin with, the joystick response throughout the program is sluggish and very touchy; it is difficult to place the pen exactly where you want it. In addition, the program requires that you retreat to the keyboard for many options. It is uncomfortable to constantly switch from joystick to keyboard.

A nice feature in most of the new graphics utilities is the OOPS or UNDO command. *Cosmic Paint* has a command called WRENCH that will erase the latest addition made to the screen. This is an especially helpful command in many graphics packages because you can experiment without worrying about the changes being permanent. With *Cosmic Paint*, once you WRENCH something off of the screen, you can't put it back.

Another drawback of the program is that in order to change the color of the pen (i.e., draw or erase), you must go through two menus and then, when you get back to the graphics screen, you must reselect the pen mode.

Speaking of getting back to the graphics screen, this program includes an option for putting text on the graphics screen. What distressed me is that most of the menus are on the standard 32-column text screen! I may be spoiled because most of my programs use a high resolution text screen, but I feel such cosmetics are standard on quality graphics software.

As mentioned earlier, I like to make screen dumps. Once again, I was let down with this program. There is a printing icon and, indeed, a routine that will dump the graphics screen to the printer (provided you own a Radio Shack printer). The routine included in the package is both slow and limited. If you don't have a Radio Shack printer, or want an image reversed or enlarged, you have to supply your own screen dump utility. The instructions tell how to patch such a utility into *Cosmic Paint*. The screen dump is also very slow (typically five minutes for a single dump).

Let me briefly describe the one feature I like and have not seen in any other utility. It is called "Boxes." To use it, you simply define the two corners of a rectangle as in any standard utility, then the rectangle is drawn. Next, you have a third point to define, which is the corner of a three-dimensional box. This option does not outweigh the many shortcomings, however.

Cosmic Paint is decent, but it falls short of today's software standards.

(Cosmic Software, 515 Beverly West, Sherwood, AR 72116, disk only, $20)

— Rick Rahim

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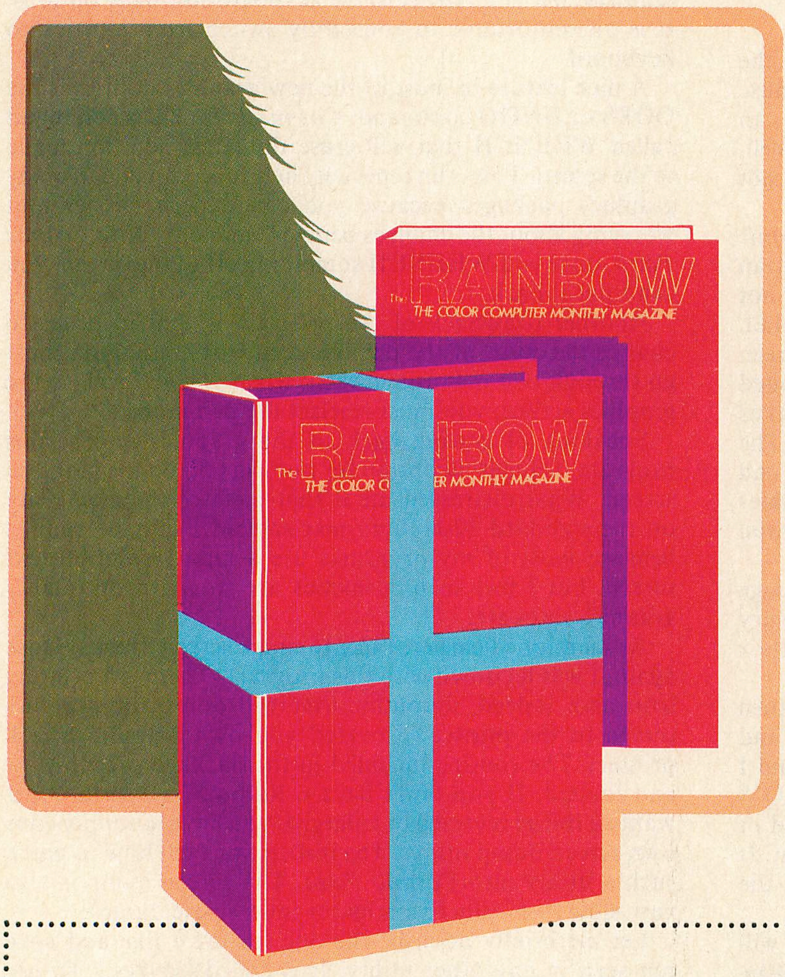
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Play The Game Of 'Life' With *CoCo-Life*

Some years ago an English mathematician/philosopher, John Conway, created a simple one-player game called "Life." The game is played on a checkerboard grid; markers are placed on the squares. These markers are known as "living" squares. The living squares are then allowed to "live" according to a set of simple rules: 1) Living squares that are crowded die off, 2) Squares that are isolated from other living squares die off and 3) When the right pattern of squares develop, living squares are born.

CoCo-Life is the CoCo version of the game of "Life." The program comes in two versions, a 16K one-player game and a 32K one- or two-player game. Both versions are delivered on tape and accompanied by a single sheet of instructions. The game is easy to play; therefore, the single sheet of instructions is adequate. They tell the user to read the October 1970 issue of *Scientific American* magazine to get details on the original game of "Life." This is not realistic — a good synopsis of the original game should be included with the instructions.

The 16K version is played on a low resolution screen. You can choose the display color. The 32K version is played on a high resolution screen and has three two-player games. Player colors are fixed in the two-player games. A screen dump is available in both the 16K and 32K versions. This gives a hard copy of any patterns.

By following the simple instructions, you can be playing the game in a short time. The player or players set up living squares. The computer then takes over the game. Some fascinating patterns can emerge. The patterns grow, separate and die according to preset rules.

I found the two-player games more enjoyable. The three two-player games are "Passive," "Aggressive" and "Kaleidoscope." Of the two-player games, I liked the Aggressive game the most. In the Aggressive and Kaleidoscope games, living squares can be captured and their color changed to the opponent's color.

CoCo-Life is initially fascinating. After a while I became bored because of the lack of player participation. I invited another computerist to play the game and he came to the same conclusion. It could be improved and made more viable by more player participation.

(Tothian Software, P.O. Box 663, Rimersburg, PA 16248, 16K/32K ECB tape $19.95)

— Gabriel Weaver

BRITEFACE Combines Brains With Brawn

More than a dozen serial/parallel interfaces are available for the CoCo. Some require no external power. Others feed both a printer and a modem. A few support several modems and printers all connected at the same time. BRITEFACE, however, has something unique — brains!

BRITEFACE is an intelligent serial/parallel interface. It is manufactured by PBH Computer Products, Inc. and marketed by Spectrum Projects. This interface requires a Centronics compatible parallel printer and a 110-volt, 60 Hz power source. It will operate with either a Radio Shack MC-10 or a Color Computer. However, the CoCo must have Color BASIC 1.1 ROM or later. It's small (4¼ by 3¼ by 1½ inches) and has all of the necessary connectors (AC adapter, four-pin DIN plug and 36-pin standard printer ribbon).

What makes BRITEFACE an intelligent interface? BRITEFACE has a built-in microprocessor that samples incoming data and computes the effective transmission rate. Put simply, this device automatically senses the Baud rate of the transmitted data and sets itself accordingly. This eliminates the need to turn a knob in order to change the Baud rate.

BRITEFACE will function at the following standard printer Baud rates: 600, 1200, 2400, 4800 and 9600. Just set the rate in your program or `POKE` the correct value into memory and start printing. If you need to change Baud rates, all you have to do is press the red reset button on the interface. Becky, my wife, likes the simplicity because she doesn't have to remember which program runs at which Baud rate.

BRITEFACE is also very dependable. I've been running it heavily for the last week. I've printed text files, listed programs and printed graphics screen dumps at different Baud rates and have not had a single dropped or garbled character.

In conclusion, if you need a serial/parallel interface, BRITEFACE is one to definitely consider. I could find no shortcomings in this product. The instructions are clear and adequate. It is competitively priced, simple to operate and very durable. The phrase "user friendly" truly applies to BRITEFACE — the intelligent serial interface.

(Spectrum Projects, Inc., P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, $59.95 plus $3 S/H)

— John R. Curl

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Naugus Provides Hours Of Enjoyment For Adventurers

When I first received *Naugus* to review, I thought, "Oh boy, a game! This looks like fun." I settled down for an evening and began by reading the instruction manual. While reading, I found myself lost in a fairy tale world. A knight in shining armor is betrayed by circumstances beyond his control. He has to fight terrible monsters to find a magical scepter to redeem his honor.

When I started playing the game, I realized right away it was not a run-of-the-mill game that can be mastered in one evening. But after a couple of nights of playing, I finally felt comfortable enough to write about it (even though I've never been able to obtain the magic sword).

Naugus is a machine language Adventure game for people aged 12 and up. The Adventure begins before you actually start the game. In the instruction manual, which is quite fun reading, it tells us that Byron Axehead, captain of an infantry troop for the king, gets involved in an altercation in a local tavern where a patron is killed by Axehead's sword. This patron happens to be the brother of the king, which means Axehead will have to be beheaded. Since he has been loyal as a captain in fighting on the northern frontier, he is given a chance to redeem himself. He must obtain and return to the king a magic scepter hidden in the magical forest, which is protected by the Naugus. Before he can get to the forest he has to work his way through two other forests that are inhabited by Zombies and Lyxes. He is not allowed to take anything with him, but must find everything he needs in the forests. In this game, you are Byron Axehead.

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The game itself consists of three forests you must work your way through. Each forest has 25 screens, which are moved through by using the right joystick. By pushing the number '1', you can see a map of all 25 screens in the forest and which screens you have been through.

When first starting *Naugus*, you enter the first forest protected by Zombies. They are rather slow creatures who have one redeeming quality: They don't leave any bones around if they kill you. There are two things that must be done in the first two forests: 1) Find the key and door into the next forest, and 2) Gather all the weapons and tools you can find.

The weapons are a sword, which can only be used at close distance, and a longbow, used for long distance protection. To use the longbow, you must have quivers of arrows. Each quiver has five arrows, so you want to gather as many quivers as possible. Running out of arrows or not having a sword can be very harmful and shorten your life significantly.

There are also tools you can gather: a rope to climb trees (which is helpful since Zombies and Lyxes cannot), a boat to cross water, magic potions and healing potions to restore strength. At the top of each screen is a display that shows what's in your possesion.

The second forest is protected by the Lyxes. These creatures have no redeeming qualities. They will chase you and throw things — formidable opponents to say the least. You can also gather weapons and tools in this forest.

The third forest is protected by the Naugus who will pursue you from screen to screen. (In the first two forests, Zombies and Lyxes can only move within the screen on which they are found.) The Naugus cannot be killed like the Zombies and Lyxes; it can only be stunned. After obtaining the scepter you have to escape the Naugus and get out of the forest. This is a challenge for even Byron Axehead, former captain of the king's Border Legion.

I found *Naugus* very challenging. It's not the kind of game you can master in one day. The graphics and sound are good and utilize the capabilities of the Color Computer. The manual that comes with the program is brief but very entertaining, while it provides the essential information to get you started. I think *Naugus* is a good cross between arcade-type games and Adventure games; it uses both the manual dexterity skills necessary for survival against enemies and the deductive skills needed to find solutions and develop strategies. I recommend *Naugus* to anyone who wants to have many hours of enjoyment because it is difficult, yet can be won.

(Freebooter Software, P.O. Box 59537, Pittsburgh, PA 15210, 16K ECB tape $17.95, disk $19.95)

— Thomas E. Nedreberg

War of the Worlds: Fast-Paced Adventure With Good Graphics

Most Adventures start off with a phrase something like this: " . . . You are in a field. In the distance you see a castle. Possible directions are North, East, West, and South. . ." at which point the novice Adventurer nervously has a quick drink from his handy glass of soda or coffee, wrings his hands, licks his lips and pounces on the keyboard with heart pounding.

The veteran Adventurer, cool, calm and ready for anything at this stage, smiles quietly at the familiarity and commences with the usual routine of looking, inventory and so forth, as practiced fingers efficiently tap in the single letter abbreviations of commands and sentences that are a terse two words.

War of the Worlds is different. From the start, you are greeted not with the scenario, but a screen called "Master Control," which is available at any point in the Adventure by pressing the space bar. This is the only contact needed with the keyboard. Master Control gives options to quit from the game, save a game, load a previously saved game, start from the beginning or resume play. Choices are made by using the right joystick to place a rectangle over the option.

Assuming you are starting a new game, the title and a text screen giving the background of the Adventure appears, then surprise number two arrives: graphics! The graphics are black on a green background, yet they do add a sense of detail and realism to the Adventure. They are fairly well-detailed, clear drawings that resemble a series of lithographs. I found them to be more of an enhancement than a detraction to the Adventure. Certainly, color graphics could add to the program substantially, but there is a problem with enough memory to store the color as well as the drawings. Therefore, Triad Pictures decided on highly detailed graphics instead of color.

War of the Worlds is an Adventure in three parts, called "chapters." Chapter One is titled "The Landing," Two is "The Quest " and Three, "The Last Hope." It is advisable to play the chapters in order since they do follow a plot.

This Adventure is for the moderate to advanced Adventurer. Although it is entirely joystick-driven, and the options for each of more than 200 situations per chapter are right on the screen, this is a tough one to solve. As an experienced Adventurer, I have not entirely solved all three chapters as of this writing, so fear not, I will tell no secrets! I will, however, suggest that if you are a novice looking to sink your teeth into a tough one, this is an excellent Adventure on which to start. Those who are experienced, dive right in; this one takes time and careful thought!

War of the Worlds comes with an eight-page booklet that gives loading and game play instructions as well as some background to the Adventure, which is refreshingly thorough considering most Adventures rarely give more than a paragraph or two of documentation. There are also two maps in the manual. What they are and how to use them is for the Adventurer to find out!

One minor omission is the failure to mention use of a mouse. The manual specifies a Radio Shack-type joystick, but I found a mouse to be much easier and faster to work with. The manual also states that the program may not work with the disk drive controller plugged in, but I found the program to function without difficulty with or without the controller.

Because the scenario of *War of the Worlds* is that of an alien invasion of Earth, it is particularly easy to get "killed," so caution is always necessary in dealing with these unpredictable creatures. Also, don't underestimate the Priest — he may seem like a sluggard at first, but he comes up with some lifesaving ideas from time to time!

This is a moderately difficult, well-written Adventure. It is unique in its combination of graphics and joystick control. Because it is written in three 64K chapters, it provides a more sophisticated challenge to the player. Despite the few minor drawbacks mentioned, I recommend *War of the Worlds* to anyone with a healthy desire to explore the unknown.

(Triad Pictures Corp., P.O. Box 1299, Sequim, WA 98382, requires one Radio Shack-type joystick, 64K cassette $39.95)

— Jeffrey S. Parker

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Latin Translator Is The Ideal Reference For The Linguist

Latin Translator is an interesting program with a very specialized application. At first blush, this program promises to offer more than experts have been able to entice the Cray 1 Supercomputer into performing, which is translation from one language into another. No, Mr. Pottinger, the author of the program, has not accomplished the miraculous, but he has done a fairly nice job of writing a program that fulfills some specific needs for the first-year student of Latin.

To the linguist, language is simply a communication system with more or less deviations, called irregularities, from the system. To the beginning student of language, it is a chaotic mixture of new words, new spellings, unreasonable changes and language constructions that he has never had to think about before. This program is the ideal reference item to the first semester Latin student using the textbook *First Year Latin* by Jenney, Scudder and Baade. The *Latin Translator* utility package gives the declension of nouns and adjectives, and the conjugation of verbs contained in this book. It is disk based and requires 32K Extended BASIC.

After a rather nice graphics page, the program presents a menu that offers the choices to decline nouns, conjugate verbs and translate sentences. You must be able to offer Latin examples for each of these choices, spelled correctly and following some strict limitations. Two pages of typeset instructions give short examples and outline the limitations (it even has a short heading labeled "BUGS").

Menu choice one offers declension of nouns. (Declension refers to the endings required for words serving in various parts of the sentence structure.) You may choose to include an adjective to modify a noun. You then supply the nominative and genitive singular forms of the noun, same for the adjective if desired. The program then presents the five Latin declensions in singular and plural forms.

Menu choice two asks for the first three forms of the verb and for the English meanings of that verb. It then presents the six conjugations and translations for the verb.

These two modules take advantage of the fact that Latin is rather regular in its construction, as languages go. It also limits vocabulary to that from the textbook, although there is a way around that, which I'll explain later. Other limitations, clearly explained in the documentation, are that the first three declensions only are possible, the first two conjugations only are possible, and the translator works for the first and second declensions and first conjugation active voice only. (Are you beginning to feel more like the linguist or the student at this point?)

The translator module asks for a Latin sentence, which must observe a specific word order and end in a period. The program then searches its vocabulary files and offers a translation, provided all the words are in its list. If not, it tells you which word is not there and you start all over. English results are not necessarily examples of good usage, but will offer the general idea of the meaning. All output may be directed to the printer instead.

There is a flaw in the performance of *Latin Translator* that, unfortunately, is partly the fault of our CoCo's 32-character screen. When, using the declinor, the answers exceed 16 characters, severe misalignment occurs. Answers of this length are common when an adjective is included in the declension. When I used the conjugator, the future perfect tense always scrolled off the screen for the same reason. The subject and two helping verbs for the English alone puts almost every answer over the 16 character limit.

It may appear that this program has a small audience and application: limited to the vocabulary of a specific textbook, to the most regular and introductory constructions and to the Latin language. The program itself offers solutions to the first limitation. It includes a series of three programs that create new nouns, verbs and other type words for the dictionary used by the core program. It also has programs that append two files so the dictionaries may achieve great size, and a program to view the dictionary lists. These are all fairly simple programs to use, so customizing the entire program should not be too daunting.

It should be possible to adapt this program as a utility for the beginning stages of other languages. It would need extensive revision, but the program structure and algorithms are all in place. Perhaps *Latin Translator* may also find a wider audience of teachers of other languages, with programming talent, who may think of it as a language utility generator.

(H. Joseph Pottinger, 13 Pauline Lane, Rolla, MO 65401, 32K ECB disk $14.95 plus $2 S/H)

— Dennis A. Church

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Utility Routines Contains 28 Subroutines In One Package

By A. Buddy Hogan

Utility Routines is really misnamed. If anything, this neat little package should be labeled "Utility Bonanza." It contains 28 of the most useful machine language subroutines I have come across — all in one neat package.

For the very new CoCo users, a subroutine is part of a program called upon to perform some task that is used by the main program. A program may use as many subroutines as the programmer needs, within the limits of available memory. A subroutine is ordinarily "called" by the main program by `EXEC`uting it or by a `GOSUB` command. Some programs use subroutines contained in the CoCo operating system (Color BASIC, Extended Color BASIC or Disk Extended Color BASIC) to perform certain tasks. In short, subroutines are *included* in a program, they are not stand-alone programs.

The following subroutines are contained in the package from Microcom Software (the number of bytes used by the subroutine and the CoCo system requirements are at the end of each description):

1) Border Creation — Creates as many as 255 different border styles on the text screen. These borders consist of letters, symbols and graphics symbols. (35 bytes/ 16K, ECB)

2) CLEAR-Key Disable — Disables the CLEAR key during `INPUT/LINEINPUT` commands so you won't accidentally erase the screen. (39 bytes/ 16K, ECB)

3) Command Keys — This powerful routine allows you to use two keystrokes (the down-arrow key with any of the 26 letters of the alphabet) to automatically enter many common CoCo programming terms. This is useful for entering long program listings. (254 bytes/ 16K, ECB)

4) Cursor Styles — Create up to 65,000 different steady or blinking cursors. (92 bytes/ 16K, ECB)

5 and 6) Error Skip — Two routines are provided, one for BASIC and one for machine language programs. This routine is usually called "ON ERROR GOTO." The necessary line to be included in your BASIC program is given in the manual for the actual ON ERROR GOTO instruction. (47 bytes (BASIC)/ 16K, Color BASIC; 58 bytes(ML)/ 16K, ECB)

7) Full Length Errors — Print out the error message in full instead of the two-letter abbreviation. (762 bytes/ 16K, Color BASIC)

8) Graphics Scroll — Allows you to scroll up the graphics screen in any `PMODE`. (51 bytes/ 16K, ECB)

9) Key Clicker — Every time a key is pressed, you will hear a click. This helps you type with the confidence of knowing a key has been "recognized" by the program. (39 bytes/ 16K, ECB)

10) Line Auto Increment — Usually called "Auto Line Numbering," this utility automatically puts in line numbers when you are typing in a program. (181 bytes/ 16K, Color BASIC)

11) Memory Detection (32K/64K) — This routine answers the questions, "Is it 32K or 64K?" and "Was the memory upgrade installed properly?" (33 bytes/ 32K, ECB)

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Contains a series of utilities for programmers. It includes the following:
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PRL - prints a formatted file listing that will add line numbers, pagination, etc.
FF - creates a list of functions from a "C" source listing
MERGE - will merge one or more files together into one single file

Group No. 2
A series of helpful general utilities for all OS-9 users and programmers. Included are:
HELP - disk resident help system that avoids tying up valuable memory but that provides on-line help descriptions of almost all OS-9 commands that are commonly found in the OS-9 system and popular system upgrades
UNIT - this utility provides descriptions, units, and constant conversion factors for hundreds of scientific and technical terms, measures, constants, etc.
ERR - provides on-line descriptions of numeric error codes. Does not take any extra memory as the normal error routine does.

Group No. 3
This third group of utilities is written in BASIC09. It includes:
FILEDEL - will prompt you for deletions of all files resident on a disk without repetitive typing of file and path names.
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12) Pause Control — Allows use of the SHIFT key and space bar to pause any BASIC program and some machine language programs, and the SHIFT key and space bar to resume the action. Lets you have your cake and eat it, too: play computer games and answer the door, eat, etc., without losing the results of hours of computer time. (101 bytes/16K, Color BASIC)

13) Repeat Key — Not only will this routine allow you to have the key being pressed repeated as long as you hold both it and the CLEAR key down, you also can choose up to five repeat speeds. (116 bytes/16K, ECB)

14) Reverse Video (Green) — Changes the bright green screen display to a more pleasing "soft" green that is easier on the eyes. (208 bytes/16K, ECB)

15) Reverse Video (Red) — Makes white characters on a red screen. (217 bytes/16K, ECB)

16) Save Graphics to Tape — Saves a graphics screen to tape. You may then load the graphics screen back from the cassette whenever you want. (22 bytes/16K, ECB)

17) Save Text Screen to Tape — This one saves a text screen to tape. (24 bytes/16K, ECB)

18) Screen-to-Printer — Whenever a character is printed on the screen, this routine sends it to the printer, also. (71 bytes/16K, ECB)

19, 20 and 21) Spooler (16K), Spooler (32K) and Spooler (64K) — These utilities allow you to continue using the computer while you're simultaneously using the printer. They set up a buffer of 2K (Spooler 16K), 4K (Spooler 32K) or 32K (Spooler 64K) to handle the material to be printed while you do something else. (2,229 bytes (16K), 4,277 bytes (32K), 184 bytes(64K)/16K, ECB)

22) Super Error — Places you in the EDIT mode whenever you encounter an error in program execution. (86 bytes/16K, ECB)

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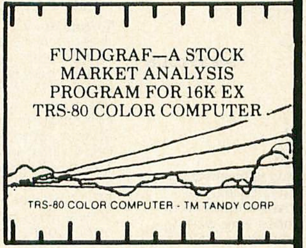

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23) Super Scroller — This routine really lives up to the name "utility," meaning useful. It will save up to 32K of screen text and lets you scroll through it forward or backwards. It even beeps when you get to the end of the buffer. The line saving feature may be turned on or off. Now you can list that 1,000-line program and scroll through it at your leisure. (355 bytes/64K, ECB)

24) Tape Index System — Creates an index of all the files on a cassette tape. It skips all I/O Errors so you can easily index "bad" tapes. The index includes the file type (BASIC, machine language, data) and the file format (ASCII or binary). (140 bytes/16K, ECB)

25 and 26) Tape to Disk Copy — Comes in both 1.0 and 1.1 Disk BASIC ROM versions. It will transfer BASIC and machine language programs from tape to disk. The manual claims the 1.1 ROM version will handle 95 percent of the 1.1. BASIC and ML programs. (228 bytes (1.0) and (1.1)/16K, Disk BASIC)

27) Text Screen Scroll Protect — Keeps the text screen from scrolling. (123 bytes/16K, ECB)

There is another routine, called "Console In Routines," that is a combination of the Repeat Key, Cursor Styles, CLEAR Key Disable and Key Clicker routines all in one. These routines are combined because the manual lets you know ahead of time that it is very difficult to use any of these routines together in your program, so it has been done for you.

The joy of this review was not just the availability in one place of most of the utility routines I have needed or read about, but, most of all, the willingness of the author to share with the purchaser all of the details about the routines' operation and how they may be used in one's own programs.

The routines are explained so even a novice machine language programmer can understand what the author is doing. Each routine is listed in full and the manual even includes a program that will allow those who don't have an editor/assembler to key in the listings. The package would actually make a good machine language tutorial workbook for use in the classroom or by individuals trying to learn machine language programming on their own.

The manual is bound and consists of 80 pages (8½ by 11). The author, Kishore M. Santwani, advertises on the cover that it contains "Routines that will otherwise take years of programming experience to learn." That is an understatement.

If you don't want to key in all these routines, you may purchase them on cassette or disk. The manual that comes with the tape and disk is an abbreviated 13 pages (8½ by 5½) stapled in the middle. It contains only the essentials, with no program listings or detailed explanations — just what it will do and how to use it.

Microcom Software has certainly made a valuable contribution to the CoCo Community with *Utility Routines*. They have even gone the extra mile to allow software authors to use these routines in their programs without the need to pay any royalties. You can pay plenty for some of these routines, which are sold separately by others, or you can get them all in *Utility Routines* for peanuts.

(Microcom Software, P.O.Box 214, Fairport, NY 14450, manual $19.95, routines on cassette or disk $24.95, manual and cassette/disk $36.95)

Soccer Statistics Package Keeps Stats In Check

Soccer is enjoying increased popularity here in the States, and Sugar Software is out to provide assistance to soccer coaches and fans with a new statistical package designed to maintain accurate records of teams and their opponents. The program is written in Extended Color BASIC and requires a minimum of 32K, one disk drive and a printer.

Having reviewed other Sugar Software programs, I can honestly say they continue to produce well-written and user friendly programs for the CoCo. *Soccer Statistics Package* is completely menu-driven, simple to use and comes with a thorough 13-page instruction booklet. However, it is so self-prompting that once you begin using it, you will find very little need to refer to the instructions. Also included is a set of sample data for the user to "play with" to get the feel of the program.

The main menu consists of the following options:

1) Player stats new start
2) Player stats continued
3) Opposing stats new start
4) Opposing stats continued
5) Review or correct
6) Add new players
7) Output stats to printer
8) Print team summary
9) Goalie stats
10) End program

Options 1 and 3 are used at the beginning of the season to load initial information. Options 2 and 4 are used during the season to enter continuing statistics. Option 5 allows you to display and correct existing information. Options 6, 7 and 8 are fairly straightforward and option 9 allows update of the goalie stats, which, because of their different content, are maintained separately.

Once the statistics are loaded, they can be printed in several different ways:

1) A basic printout of all statistics entered.
2) An individual player summary by game of each player's efforts, including scoring percentages.
3) A team summary containing all accumulated stats to date for all players.
4) An opposing team summary by individual team with a column for total points scored to date, scoring percentage by opposition to date and average points by opposing team to date.
5) A printout of the goalie stats for each goalie by game with the percent of opposing shots scored on each goalie.
6) A goalie summary containing accumulated totals of all games played to date for each goalie.
7) Finally, since all reports contain abbreviations for the column headings for each statistic, an optional, single page explanation of each abbreviation can be printed for ease of reference.

I hope this gives an idea of what this package is capable of and whether or not it could be of benefit to you as a coach, player or fan. If you are a player, perhaps your coach would be interested in your assistance in computerizing the team's records. Whatever your decision, this is a well-done program that deserves serious consideration.

(Sugar Software, 1710 N. 50th Avenue, Hollywood, FL 33021, disk $29.95)

— Ken Boyle

One-Liner Contest Winner . . .

This one-liner animates a running stick figure across the screen. It demonstrates some principles of flicker-free animation, the use of a variable as a horizontal coordinate in a `DRAW` string (=H;) and the use of a short `PLAY` pause as a delay.

The listing:

```
1 PCLEAR8:A$(1)="BR10U8NU6G4R3":
A$(3)="E8NU6D5E4":A$(2)="BU4E4R4
NU6F4R3":PMODE4,1:PCLS1:SCREEN1,
1:DRAW"BM0,96C0R255":FORX=240TO1
0 STEP-30:H=X:FORY=1TO3:PMODE0,6
:PCLS1:PMODE4,5:DRAW"C0BM=H;,95"
+A$(Y):PLAY"P120":PCOPY6TO2:H=H-
10:NEXT:NEXT:GOTO1
```

Stan Osterbauer
Sequim, WA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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Protector Helps Eliminate Program Piracy

Software piracy. This doesn't sound like such a bad thing. Actually, it sounds kind of exciting — makes you want to buy an eye patch and a parrot. After all, you are not actually stealing anything, you are just "copying" your buddy's program for your own use, or trading a few programs with your friends. What possible harm can that cause?

As a person who has marketed Color Computer software, I know better. Many hours are spent writing, testing and debugging software. If the author does not receive what he considers adequate compensation for his effort, he won't create another program. It's just not worth it.

The programs I sold were written in BASIC, were not copy protected and were designed to be used with a speech pak. They sold for a reasonable $9.95. When they were sold at a Southern California RAINBOWfest, often a group would come to the booth, examine the programs and buy one copy, split the cost and copy the program for everyone later. Since there was no copy protection, duplication was as easy as typing `CSAVE`.

Six generations of "trading" from only one sale with four copies being made from each copy generates 2,625 copies of a program. The market then becomes saturated and the product dies.

My reaction to seeing so many unsold copies circulating, after an initial rise in my blood pressure, was to forget about the software market. It was just not worth the expense and effort. If enough authors walk away from the Color Computer market, there won't be any really good software available for our computer.

An alternative to quitting the business is being offered by Racine Software to authors of cassette-based BASIC programs. Called *Protector*, it prevents copying of BASIC programs by ordinary means.

After loading and executing *Protector*, load the BASIC program and resave the modified program for sale. The customer can then no longer use the `CLOAD`, `CLOADM`, `CSAVE`, `CSAVEM`, `PEEK`, `NEW`, `LLIST`, `SKIPF`, `DEL`, `TRON`, `DLOAD`, `RENUM`, `POKE` or `LIST` commands. The BASIC program is also loaded in sections, like an ASCII-saved program, to the accompaniment of clicking cassette relays and varying volume levels that will negate the various cassette program copiers being offered. These protection devices are combined to take the "yo-ho-ho" out of some software pirates.

Of course, there are means of bypassing *Protector*. Since this program generates a cassette, it could be copied via dual audio cassettes, but the reliability and consistency of an audio copy is poor.

It's a shame that programs such as *Protector* have to be offered, but it's a better alternative than no programs at all.

While *Protector* is a fine, functional program, the packaging (none), documentation (four somewhat confusing xeroxed sheets loaded with typing errors) and the quality of the cassette (K-Mart C-60) leave quite a bit to be desired. A program of this quality deserves better packaging and documentation.

If you do, or are intending to market cassette-based programs for the CoCo, the salability of your program will be extended by using *Protector*.

(Racine Software, 5220 S. Birmingham, Tacoma, WA 98409, $25)

— Bruce Rothermel

One-Liner Contest Winner . . .

Schooner draws a picture of a sailboat on the sea, using the `LINE` command to draw each sail.

Leonard MacEachern
Inverness Co., Nova Scotia

The listing:

```
10 PMODE4:PCLS:SCREEN1,1:DRAW"BM
144,96NU82NR34NL78D20L2NU10L100D
5F10R140E20M-70,+5":POKE178,2:PA
INT(128,130),,1:POKE178,1:LINE(0
,132)-(255,191),PSET,BF:POKE178,
3::FORA=0TO320:LINE(128+50*COS(A
/57),96)-(144,192-(128+50*SIN(A/
57))),PSET:NEXT:POKE359,1
```

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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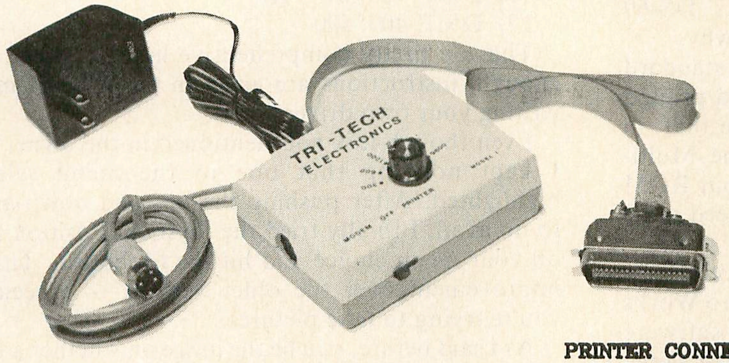

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C-SEE Version 2.0 Improves DS-69 Digisector Package

"Smile, you're on *Candid Camera*" is being replaced in the CoCo ranks by "Smile, you're on CoCo camera." If you read my previous review of Micro Works' DS-69 Digisector (May 1985, Page 197), you will know why.

The Digisector is a fast scan digitizer that allows standard video to be sampled, displayed, saved to disk and printed by the CoCo. The digitizer is a hardware device that, in the case of the 64K disk version, plugs into the Multi-Pak Interface. The tape version plugs right into your ROM Pak port. In addition to the Digisector, you will need some source of video, such as a camera or VCR.

Why are we reviewing this product again? Several new improvements to the software have prompted Micro Works to release Version 2.0 of *C-SEE*, the operating software for the DS-69 Digisector. The main program is the same, but several features have been added, such as joystick control, more printer drivers and a configuration program.

The first thing you do with *C-SEE* is `RUN"CONFIG"`. This allows you to specify the type of interface, Radio Shack or PBJ, and which slot the Digisector occupies. Previously, you were restricted to Slot 1.

The next choice is the printer driver you wish to use. The following list is displayed:

1) Epson
2) Gemini
3) HP Thinkjet
4) HP 2686A Laserjet
5) NEC 8023
6) PMC DMP-85
7) C.Itoh 8510
8) Apple Imagewriter
9) Prowriter
10) DMP-100/LP VII
11) DMP-120/LP VIII
12) DMP-400/500

That's a pretty comprehensive list of choices; if it's not enough, instructions are given in the owner's manual for writing your own driver.

Even though it is not mentioned in the owner's manual, I kept noticing that one of the menu selections is highlighted. After pushing the up- and down-arrow keys to no avail, I finally tried the joystick. Position the cursor on your menu choice and hit the firebutton. That's a vast improvement over the older version — especially when you're trying to take pictures.

As I said before, you be the judge on whether a Digisector is a required accessory for your CoCo. Version 2.0 of *C-SEE* makes the package a little more versatile and user friendly. We suggest that owners of the original version write to Micro Works regarding an update policy on Version 2.0

(The Micro Works, P.O. Box 1110, Del Mar, CA 92014, DS-69 Digisector and *C-SEE* software $149.95)

— Dan Downard

BASIC COMPILER

WASATCHWARE believes that users of the Color Computer deserve the right to use all 64k of RAM that is available in the computer, and have fast machine language programs that use the full potential of the 6809 microprocessor. That is why the BASIC compiler, called MLBASIC was developed. Here are some of the reasons that make this compiler one of the best bargains in this magazine:

- Programs can use all 64k of RAM for either program storage or for large numbers of variables and arrays like A(20000)
- Full Floating Point arithmetic expressions with functions
- SUBROUTINE and CALL commands allows for structured programming and more independent program development
- Full sequential and direct access disk files allowed
- BASIC source and M.L. output I/O to disk, tape or memory

COMMANDS SUPPORTED

```
1. I/O -Commands
    CLOSE    CLOADM   CSAVEM   DIR      DRIVE    DSKI$
    DSKO$    FIELD    FILES    GET      INPUT    KILL
    LSET     OPEN     PRINT    PUT      RSET

2. Program Control Commands
    CALL     END      EXEC     FOR      STEP     NEXT
    GOSUB    GOTO     IF       THEN     ELSE     ERROR
    ON..GO   RETURN   STOP     SUBROUTINE

3. Math Functions
    ABS      ASC      ATN      COS      CVN      EOF
    EXP      FIX      INSTR    INT      LEN      LOG
    LOC      LOF      PEEK     POINT    PPOINT   RND
    SGN      SIN      SQR      TAN      TIMER    VAL

4. String Functions
    CHR$     INKEY$   LEFT$    MID$     MKN$     RIGHT$
    STR$     STRING$

5. Graphic/Sound Commands
    COLOR    CLS      CIRCLE   DRAW     LINE     PAINT
    PCLEAR   PCLS     PLAY     PMODE    PRESET   PSET
    RESET    SCREEN   SET      SOUND

6. Other/Special Commands
    DATA     DIM      LLIST    MOTOR    POKE     READ
    REM      RESTORE  RUN      TAB      VERIFY   DLD
    DST      IBSHFT   LREG     PCOPY    PMODD    PTV
    REAL     SREG     SWP      VECTD    VECTI
```

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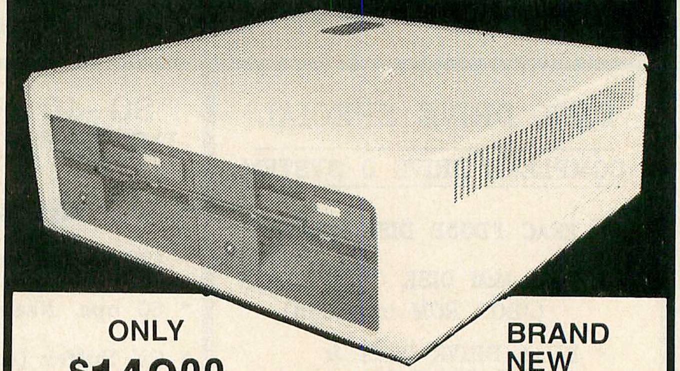

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Super Controller Fills The Need For High Quality

The CoCo has become one of the survivors in the microcomputer market; it has been around for over five years now. As time has passed, there has been a growing demand for higher quality peripherals than Radio Shack has been able to supply.

The disk controller is a case in point. Radio Shack's is adequate for many users, but lacks many of the features a more seasoned CoCoist requires. Filling this need for higher quality and performance in a drive controller, CRC Computers has introduced the Super Controller.

Super Controller is plug compatible with the Radio Shack controller. It uses a single five-volt power source, and works on either the CoCo 1 or 2. Installation involves only plugging it into your CoCo through the cartridge port and connecting the disk drive cable. The controller is cased in a rugged metal box, which cuts down on any RF problems you may be having. It also makes the whole unit able to take a bang or two.

The metal case opens by unscrewing the four small hex nuts on the outside of the case. The inside shows a well-designed and laid out PC board. All the edge connectors are gold plated, so you won't have to keep cleaning them, as with the Radio Shack controller. The controller chip is the Western Digital WD1773. This "state of the art" in drive controllers is highly reliable and should never need adjustments.

The most interesting visual aspect of the controller's PC board is the four sockets for DOSs. One of Super Controller's remarkable features is you can have up to four separate disk operating systems present in the controller and switch between them through software! You can actually put any software you want in the DOS sockets. They are set up to accept either a 2764 or 27128 28-pin EPROM.

Anything you want can be put on an EPROM and be present along with a DOS or two. The only drawback is that Disk BASIC comes on a 24-pin ROM. In order to use it with the controller, you have to get one of the small, low-cost adapters to plug 24-pin chips into the 28-pin sockets, or get Disk BASIC burned into a 28-pin EPROM. Of course, you won't have that problem with some of the other DOSs on the market, such as JDOS, HDOS or ADOS.

The controller does not come with a DOS at this time, but look for Spectrum Projects to soon have a version of "Spectrum DOS," which will take advantage of the features of this controller. Not coming with a DOS gives you the advantage of being able to choose the DOS without having to pay for a DOS you may not need.

Another interesting thing on the board is the expansion bus. The pre-production model reviewed had a 15-pin interface to add your own devices and projects. Production models will offer a 17-pin expansion bus with the addition of the reset and clock pins to the bus.

CRC already offers a few ready-made products to plug into the bus. These include a real-time clock, an EPROM programmer and a Centronics printer adapter with software driver. A combined 80-column driver, parallel printer interface and real-time clock should be available late this fall.

How does this controller perform in actual use? From my tests, flawlessly. The documentation is very clear on how to switch which socket is active, and thus which DOS or program you want the CoCo to recognize. Examples are given in both BASIC and assembly. The documentation also has a memory map of how the controller maps into the CoCo's hardware registers and a diagram of the signals available on the expansion bus.

I had no problems switching between DOSs when I used the controller. Sometimes, in addition to the poke to switch DOSs, I had to press the Reset button and/or do an `EXEC &HC000`. Additional resets always left me in the DOS I was in before pressing the Reset button. I even tried to force switch DOSs with a software cold start; nothing but the documented poke or powering off could get the controller to switch DOSs.

I also found out by leaving a socket empty and switching to that socket, I could go to Extended BASIC without removing my controller. I have a few things on cassette that simply will not run under Disk BASIC. Not having to plug and unplug the controller is a nice feature.

The CoCo sometimes acted funny if I went hopping around between DOSs. The reset, or `EXEC &HC000`, always brought me back to normal operations. It makes sense that you just can't flip back and forth with operating systems. I was surprised I didn't have to do a cold start each time. The Reset key and/or `EXEC &HC000` worked every time.

Super Controller is an upwardly compatible replacement for the Radio Shack controller that is superior in quality of construction, design and features. Its ability to switch between DOSs, expansion slot, and overall use of high quality and state of the art materials places it as one of the best disk drive controllers available for the CoCo. The price is very competitive and gives a great deal of value for the money.

Dr. Megabyte prescribes this fine product to anyone who wants the best for his or her CoCo or is just tired of the limitations and problems associated with the Radio Shack controller.

(Distributed in Canada by CRC Computers, 1720 Charette St., Bubernay Laval, Canada H7E 4L9; exclusive distribution in U.S. by Spectrum Projects, Inc., P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, $99.95 plus $3 S/H)

— Mark E. Sunderlin

Hint . . .

Don't Be Fooled By Those Error Messages

Many of our readers have written to us saying the computer tells them there is an error in a line that has been entered correctly. This is usually caused by errors in a related line. For instance, an illegal function call (FC) error is almost always caused by an incorrect variable definition *elsewhere* in the listing. Also, if a line containing a `READ` statement is typed in wrong, you will get a syntax (SN) error in the `DATA` statement line number — even though you typed it exactly as it appeared. Remember, be patient and thorough when debugging.

Fundgraf: A Serious Financial Program For The Investor

Fundgraf is a serious financial program for the Color Computer. It does what it says it will do, and a little more. It's a series of BASIC programs that manipulate data concerning a stock or mutual fund portfolio.

The data allows the owner to compare performance of securities against constants and variables, which may give the user some idea of the performance factors of his portfolio. The program is not intended to show how and when you should buy and sell. It is only an indication of the performance of the securities in the database. These would be stocks or mutuals of your own choice or updates on a sample database of 30 stocks, which is included with the program.

Fundgraf is a companion to *Fundfile*, which I reviewed here a couple of years ago. The tape version of *Fundgraf* was also reviewed here about the same time. This is a review of the disk version, which varies from the tape program in that it has sample files and a couple of other disk-oriented features.

Fundgraf consists of the main program and seven operating modes in the form of short BASIC programs. The operating modes are ADD-DATA, SHORTGRAF, LONGGRAF, MOVG-AVG, PRINTOUT, SHIFTDAT and ADDNAME. They are all pretty much what their names indicate.

Although anyone can learn to manipulate this program, it is an advantage to have a basic knowlege of investments and investment terminology. That will help you provide the information the computer needs to process the data. The documentation, which is excellent otherwise, could be of some help here. There could be a glossary that defined the terms, but you can also get those terms in many financial publications. This program is written by a person who is very familiar with investment; it can be a great help in your investment program. It does, however, require serious thought and input on your part, otherwise the data can be useless.

Operationally, *Fundgraf* is a breeze. It is menu-oriented and user friendly to a fare thee well. You can walk right through it the very first time. I cranked this program up several times and walked through the modes, and found it to be quite simple.

The documentation says all programs are a bit long for the 16K machine, which requires a `CLEAR 200` for operation. The documentation is also clear on this.

The graphing function is on the screen only. It is a very handy tool and helps you see the direct comparison of various funds. There is an additional program for sale that gives a printout and graph of any security. It requires an 80-column printer and a graphics printing program.

Overall, this program can be of great value to the investor. I must repeat Parson's Software disclaimer: "It is not our intention to state, indicate or imply in any manner, nor should you assume, that future BUY and SELL signals generated in this manner will be profitable. The computer is only reporting that a crossover has occurred using data in the files and your input of moving average span."

Fundgraf is a good program and it works. I know this because now when my CoCo talks . . . everybody listens.

(Parsons Software, Dept. A, 118 Woodshire Drive, Parkersburg, WV 26101, 16K Disk $69.95)

— Howard Lee Ball

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One-Liner Contest Winner . . .

This one-liner portrays what a landing on Mars might look like. Rather than using the `PAINT` command, the use of concentric circles provides more detail to the Martian surface.

The listing:

Brian Guillemin
Regina, Saskatchewan

```
0 PMODE3,1:PCLS7:SCREEN1,1:DIMV(
40,31):X=115:Y=1:FORM=1TO175:CIR
CLE(128,191),M,,.25:NEXTM:DRAW"C
5;BM118,13;S4F6L4G6F6L4U8E6U8E6R
12F6D8F6D8L4E6H6L4E6G6L16R6G6R10
H6":GET(X,Y)-(X+40,Y+31),V,G:FOR
Z=0TO117:PUT(X,Z)-(X+40,Z+31),V,
PSET:NEXT:FORT=1TO9999:NEXT
```

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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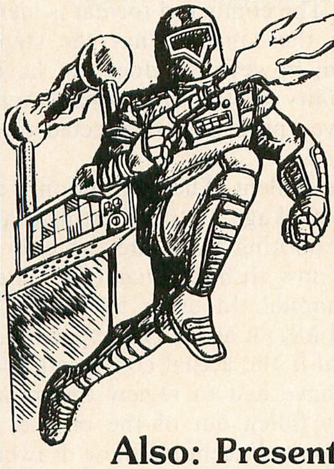

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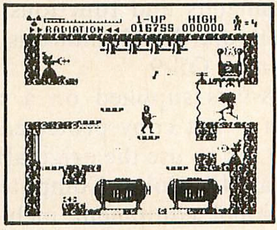

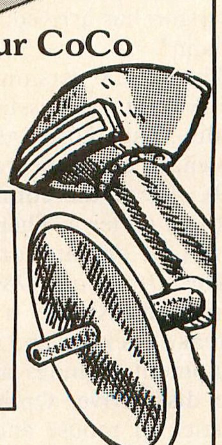

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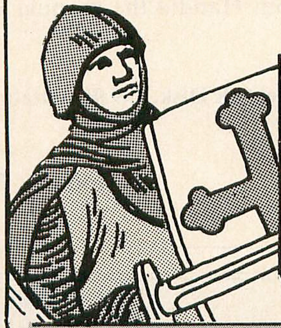
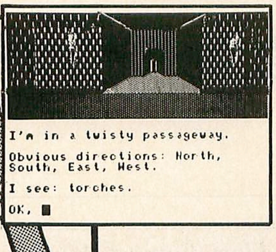
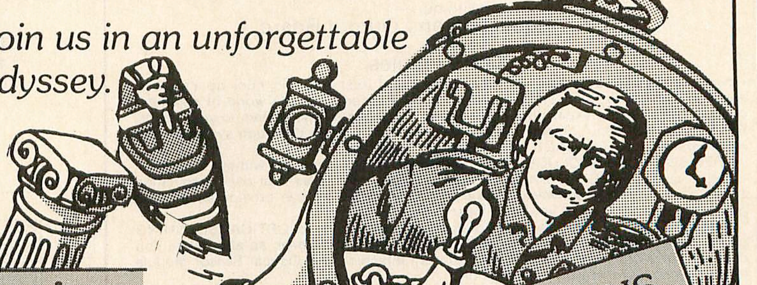




```
I'm in a twisty passageway.
Obvious directions: North,
South, East, West.
I see: torches.
OK, ■
```



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DynaCalc OS-9 — A New Horizon For Spreadsheets

DynaCalc is *the* spreadsheet for the Color Computer and is the only program on the market that spreads over the entire Color Computer operating environment. At first, it was only available for the FLEX operating system. Then came the Radio Shack Disk BASIC version. Now the OS-9 version has arrived. What other program can boast such a claim?

The FLEX version was reviewed by Dan Downard in the August 1983 issue of THE RAINBOW (Page 158). The Radio Shack Disk BASIC version was also reviewed by Dan Downard and appeared in the September 1984 issue (Page 219). All of the commands and functions were included in these reviews. Therefore, I will limit this review to how *DynaCalc* operates under OS-9.

The *DynaCalc OS-9* is supplied on a standard OS-9 formatted diskette. It is not copy protected (you are told to make backups and not to use the original). The required equipment includes a 64K Color Computer and at least one disk drive. Optional equipment includes a printer, joystick or mouse and the OS-9 operating system. That's right, OS-9 is optional. The reason for this is that on the diskette there is already a BASIC OS-9 version 01.01.00 operating system. However, this diskette includes only a small subset (four or five) of OS-9 commands.

Once you boot *DynaCalc OS-9*, the OS-9 operating system is all but transparent. During normal operation, the only reminder of OS-9 is when you save or load a file. It asks for a pathname instead of a filename. You do not have to know all of the little tricks of OS-9 in order to fully benefit from the power of *DynaCalc OS-9*.

There is about 12.3K of work space with the HELP function activated. There is close to 21K if this function is deleted. The manual states that with 21K, there is enough work space for 1,750 numeric cells. As with any OS-9 application, if you practice memory conservation, this will generally be enough work space.

This version operates almost exactly like the other versions in performance. The command format is identical and the commands are the same. It has the standard *DynaCalc* Hi-Res screen, however, it does not have the graphics printing capability of the Disk BASIC version. *DynaCalc OS-9* will drive any printer connected through the RS-232 serial port.

The program itself is excellent. The instruction manual is the weakest part of the package. In the "Getting Started" section, instructions for booting OS-9 are the only ones given. You are not told how to boot *DynaCalc* until the very last page of the manual. In order to boot it, you must type `DYNACALC` and ENTER at the OS-9: prompt. The major flaw in the manual is the actual construction of it. Over the month that I have had to review this product, one page has completely fallen out of the manual with several others ready to follow. Except for these drawbacks, the manual is very informative.

I highly recommend any version of *DynaCalc*. If you are running OS-9 or are interested in OS-9 and need a spreadsheet, then *DynaCalc OS-9* is *the* spreadsheet. OS-9 needs serious business applications; this is a giant leap in the right direction. (Caution: Handle the manual with care!)

(Radio Shack Stores nationwide, 64K Disk, $99.95, Catalog No. 26-3275)

— John R. Curl

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For a free brochure listing all add-on modules with application hints call or write to: The Color Link Incorporated, PO Box 74B, Marissa IL 62257 ph: (618) 587-2441. Shipping and handling $2.00. IL residence add 6.25% sales tax.

One-Liner Contest Winner . . .

This one-liner is called *Pulsar*. It creates an appealing image for the eyes as circles appear to pulsate in and out of the screen. (On some computers you may have to `RUN` the program a second time because of the `PCLEAR` bug.

Mike Hall
Hartland, WI

The listing:

```
10 PCLEAR8:FORX=1TO8:PMODE0,X:PC
LS:SCREEN1,1:FORY=X*2TO180STEP16
:CIRCLE(128,96),Y:NEXTY,X:FORC=1
TO9999:D=(RND(7)-1)^2:FORX=1TO8:
PMODE0,X:SCREEN1,1:FORZ=1TOD:NEX
TZ,X:FORX=8TO1STEP-1:PMODE0,X:SC
REEN1,1:FORZ=1TOD:NEXTZ,X,C
```

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

Graphicom II Is A Must For The Graphics Creator

In a time when sequels to motion pictures are somewhat expected, it is no surprise that we are seeing second and third generation creations of successful computer software. The original *Graphicom* may not have been the first graphics generator on the market, but it sure set a standard for those that followed. *Graphicom II* is a separate product from the original *Graphicom* in that it is a complete stand-alone product, not a revision. For owners of the original, the addition of *Graphicom II* will enhance your graphics cabability.

The best thing about *Graphicom II* is its user friendliness. Everything operates from menus selected by the arrow keys or the joysticks. I found the arrow keys are easier to use, but I am sure the joystick feature will make certain applications easier. It follows the same format as the original *Graphicom.*

Aside from the program disk, *Graphicom II* is capable of using three other disks. There is a user font disk, which contains several type fonts for putting text on graphics screens, and finally, any disk that contains a Hi-Res picture in binary format can be used to obtain graphics images. I discovered that pictures generated by *CoCo Max* (Computerware) and *Printmaster* (Dataman, International) will work with this program. You can experiment by attemping to load any Hi-Res graphics file. If it is not in the right format for *Graphicom II*, you will get a system error and return to the menu.

The main menu has eight selections. Each is mentioned here with a brief description.

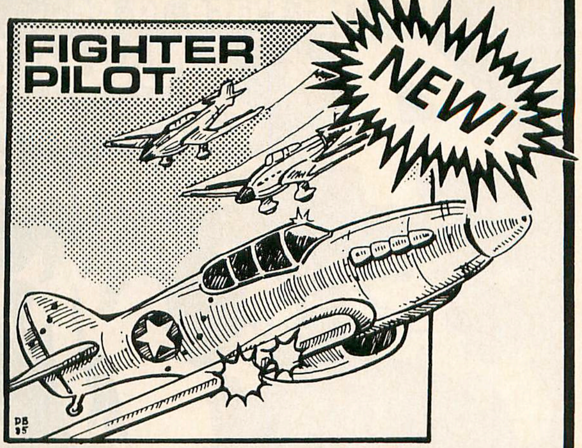
1) Disk Access permits loading, saving, viewing and killing graphics picture files. It only allows access of those files that *Graphicom II* will accept. Disk Access allows you to select the standard binary picture format, or the original *Graphicom* format.

You can also select which disk drives will be used. You can put the program disk into Drive 0 and any picture disks in Drive 1, 2 or 3. A nice feature is the "walk around the CoCo gallery," which will display all of the pictures on the disk selected each time the firebutton or space bar is pressed.

2) Pan & Zoom is used to inspect or draw a picture and is extremely suitable for detail work. Detail work is accomplished in two, four or eight power, which controls the magnification of the picture. Black-and-white or color work is available. To draw a picture, simply place the cursor at the desired position on the screen and press the firebutton. Draw by holding the firebutton down and dragging the cursor with the joystick.

3) Slide function is used to slide or exchange one portion of a screen with another. This feature takes some getting used to and requires practice. First, you must define the section of the screen you will work on, then use the slide function to swap a portion of the picture with another.

4) The Copy function is used to expand a small portion of the screen into the full screen. This function lets you select the shape and window size. There is also a screen of small selectable pictures that can be used on your screen. This function also requires some practice and the manual is a must here.



An original arcade game! Wave after wave of attacking aircraft attempt to shoot you down as you maneuver your fighter into the wild blue yonder, blasting enemy fighters, bombers and paratroopers out of the sky. Joystick or keyboard operation. "Pause game" feature. Disk version saves high scores. 32K, 100% Machine Language.

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Disk or Amdek $24.95

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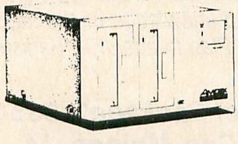

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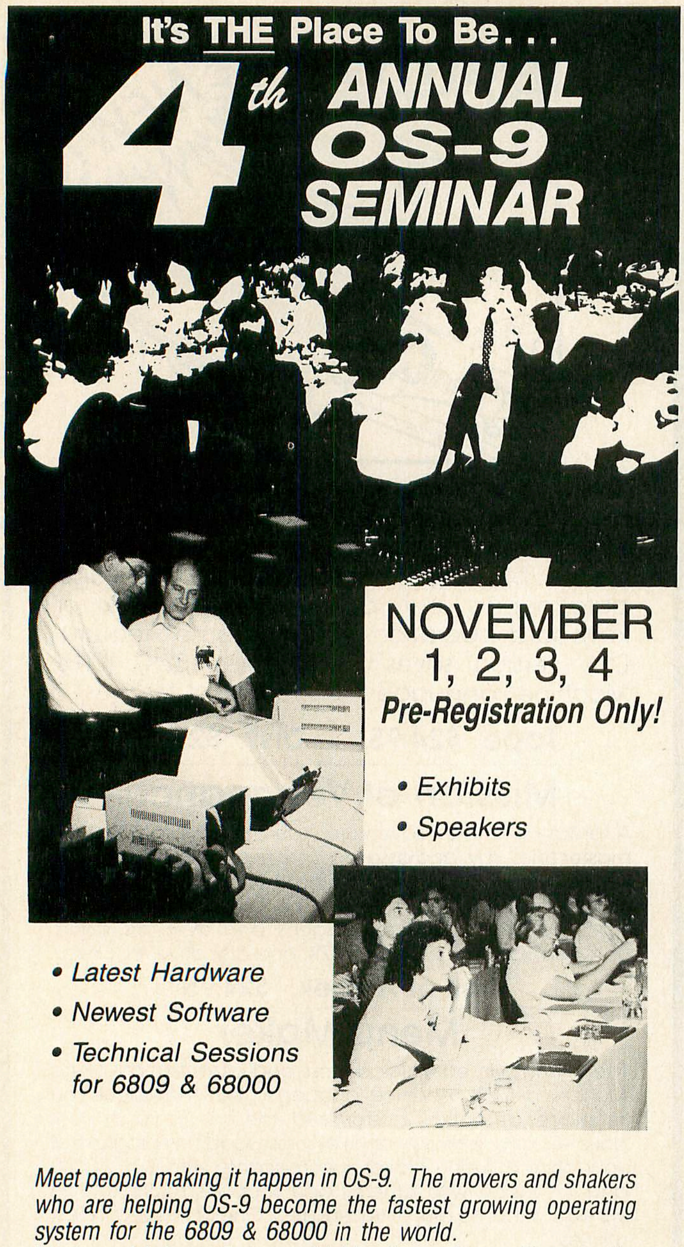
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5) The Paint function is used to paint or color your graphics picture. A pattern screen is available to select not only colors, but various combinations of colors and shapes. Additional paint patterns can be added on this screen.

6) Rotate, Enlarge and Reduce is a most interesting function. It allows you to rotate a portion or the entire picture from zero to 360 degrees; reduction or enlargement is possible at the same time. A special FX option lets you create interesting effects, such as a "tunnel" or "fisheye" vision.

7) Pixel Blaster is used to exchange colors in your picture. You can blast the entire picture or define a particular section to be blasted. The colors red, blue, white and black can be exchanged.

8) The Typesetter menu is the graphics function that allows text to be added to your picture. The *Graphicom II* disk comes with a system font set and an optional DATA70 font. Within the typeset selected, you have control over the color, height and width of the character. Sixteen different character sizes can be developed. There is a rotation feature that allows writing to be upside down, sideways, etc.

The Typesetter option also allows creation of your own character set. You can load a font set and change or adapt it any way desired. Three font disks are available from Computize, Inc. for $9.95 each.

Each of these functions lets you change `PMODE` and colors, and contains an "oops" function to correct mistakes.

Graphicom II is an excellent graphics generator. It is sold as a stand-alone product, but will greatly complement the original *Graphicom. Graphicom II* gives you added capability, but does not include a screen dump for printer operation. This product is well-developed, well-documented and is of extremely high quality. If you are into graphics, this is a must program!

(Computize, Inc., P.O. Box 207, Langhorne, PA 19047, 64K disk $24.95)

— J.D. Ray

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send an SASE to: Submissions Editor, THE RAINBOW, The Falsoft Building, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

Software Review

Colorcom/E Is An Excellent Smart Terminal Package

Disk *Colorcom/E* is a complete smart terminal package designed to work with a 32 or 64K Color Computer. And smart it is!

This latest Version 3 supports XMODEM file transfer protocol so you can download machine language programs. This is an excellent feature and a real time saver when downloading such files as *Graphicom* pictures from CompuServe, where every minute of online time counts.

The package consists of two diskettes and two well-documented booklets. The booklets deal with the operation of the program, complete with examples on how to get started and many examples of command sequences and the expected results. The instructions are well-written and easy to understand, however, the section dealing with the Auto-File log to Spectrum Projects Bulletin Board did not work! This was later found to be the result of this BBS no longer being in service. Although this was a minor problem, the user who tries to call that BBS will encounter the same fate. (Bob Rosen informed me that he will soon reconnect his system.)

The Edit Auto File mode is easy to use. I simply added the phone number and logon sequence, then called a local BBS with no problem. This Auto File mode is also a real time saver since it allows all the repetitive typing needed to logon a particular BBS up to the CoCo. If you're fortunate enough to own a modem with auto-dial capability, then so much the better.

The program can be customized to keep trying the number until connection is made. That feature, coupled with the Wake-Up mode, will knock your socks off. You can program the time of day you wish CoCo to start dialing the number — now that's power! The manual specifies that the Wake-Up mode be used only with well-tested Auto-Files for obvious reasons, however, a Set Master Timeout mode is provided that will disconnect the modem if an expected result does not occur within a reasonable time.

In the command mode the screen is split. The top portion displays data stored in the buffer while the bottom portion displays a menu of available commands. To examine received data, arrow keys are used to scroll forward and back in the file.

SHIFT arrow keys are used to display groups of lines in the file, depending on whether or not you are in the 32- or 51-character per line mode. Hitting 'T' will show the oldest data in the buffer and, if you wish, a particular section can be selected to send to your printer or save to disk. The 51-character display is easy to read, and is sharp and clear on my amber monitor.

The usual disk commands are also provided. You can (R)ead from or (W)rite to disk as well as perform a (D)irectory.

Most parameters of *Colorcom/E* can be changed to allow virtual compatibility with any BBS and computer system:

- RS-232 modem and printer protocol
- Automatic capture of characters used to open or close your buffer
- Word mode to prevent on-screen word splits
- XON/OFF for uploading files
- Carrier detection for modems without this feature
- Set time between characters when sending files from the transmit buffer. (This is valuable when the host computer cannot accept data at full speed.)

In addition to all of *Colorcom/E*'s neat features, one of my favorites is a utility called "DFT." This Direct File Transfer allows rapid, error-free file transfer between two CoCos that are running *Colorcom/E*. DFT automatically transfers the file and corrects errors detected during transmission or reception. After the file is received, it is automatically saved to the receiver's disk using the same filename that is transmitted.

DFT is menu driven and very easy to use. I used it several times to transfer programs and never had a problem. Even if someone in your house picks up a telephone extension and makes noise on the phone, DFT will detect the error and retransmit the block of data until it's received correctly.

While *Colorcom/E* is copy protected, two identical diskettes are provided so one can be stored as a backup. It also has a 90-day warranty by Spectrum Projects. An owner's registration card is provided that can be mailed to Eigen Systems, which puts you on their mailing list for future patches or updates.

In summary, Disk *Colorcom/E* offers a great bargain. It's an excellent product that is easy to use and provides the user with all he or she needs to communicate with the many bulletin boards available.

(Spectrum Projects, P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, $39.95 plus $3 S/H)

—Jerry Semones

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With *LABEL64*, It's Listing 1-2-3

Do you dread the holiday season's approach because of all of the cards you'll have to mail? Maybe it's time to reconsider just who your friends actually are, or maybe it's time for an address label program. *LABEL64* is a simple-to-use label program that is good for keeping Christmas card lists, club lists or any other long list of addresses.

LABEL64 comes on cassette and is designed for a 64K machine (it warns of problems with lesser amounts of memory). The three pages of documentation thoroughly explain the eight functions: input names, delete names/clear memory, locate names, save to tape, load from tape, list to screen, print labels and sort. One of the main attractions of *LABEL64* is that it is capable of filing, sorting and printing 300 records (addresses) at one time. It takes advantage of practically all of the computer's memory, leaving nearly 32K after loading. While in use, mistakes are easily corrected with clear prompting, and sorting is a snap.

Being an associate pastor for a church, I frequently need to send out mailings to the kids in my youth group. I keyed in the membership, then found my first criticism with the program. The addresses, as printed, were not configured to the three-across labels I had purchased. I attempted to correct the program myself, but was unable to. A quick call to Owls Nest Software put me in touch with Norman Shelton, who ably led me through not only the new parameters I needed, but also an explanation of how I could save the updated machine language version to tape.

Although it doesn't claim to be a database program, I found myself wishing for some way of being selective about the addresses I printed. The two options available for printing are all or one at a time. Finally, I found it cumbersome to have to use tape rather than disk. In all fairness, though I realize it would use up a good bit of memory, the ease of use would, I believe, far outweigh the memory loss. All in all, *LABEL64* does print labels just as it claims to do.

(Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363, cassette $24.95)

— Jefferson L. Hatch

Accomplish The Impossible With Escape From *Alcatraz*

You have been wrongfully convicted and are now incarcerated in the most escape-proof prison ever built — Alcatraz. To make things worse, you are scheduled for execution in just 12 days. Therefore, you will have to be very resourceful in order to escape the chair. Otherwise, you will not have to worry about any more Adventures!

You start in a cell room with no apparent way out. *Alcatraz* is the first Adventure I have played that gives you a time limit to solve it. Twelve days may seem long, but the time slips away very quickly.

Most all of the commands common to most good Adventures will work here, plus the author has added three commands I have not seen before. These are very helpful; they are VERBS, ROOMS and OBJECTS. After entering these commands, a list of the respective commands is printed to the screen. The HELP command is also available and will help occasionally.

Both versions, tape and disk, offer a SAVE game option. When I called Owls Nest for help, they informed me that the disk version now has multiple SAVEs, so you can save the game at different places during the Adventure. This is a useful feature because when your next step gets you caught by one of the guards, or by any of the big and unfriendly inmates, you can `LOAD` the game at the point before your fatal mistake was made.

Owls Nest Software has another fine Adventure for 32K ECB. I consider *Alcatraz* for advanced Adventurers. It is very well-written with over 50 rooms. You must do a lot of thinking, but the solution to each situation makes sense. I really resent Adventures where you end up having to "EAT DOOR" to get past something or to get into a room. *Alcatraz* has none of these types of situations.

If you are just getting into Adventures, you may want to put this one on a waiting list until you are a little more experienced. If you do decide to purchase *Alcatraz*, be prepared to sit in front of your CoCo for a few hours, but when (or if) you finish the Adventure, you'll have a feeling of great accomplishment!

(Owls Nest Software, P.O. Box 579, Ooltewah, TN 37363, cassette $17.95, disk $20.95)

— Dale Shell

One-Liner Contest Winner . . .

This one-liner, for disk users, will automatically save a program on disk before running it, if you enter the `RUN` command in a special way:

```
RUN'TEST
```

If you add the apostrophe and a filename, this line will see the apostrophe, read in the filename and save the program with that name.

Victor Capton
Troy, MI

The listing:

```
10 CLS:CLEAR200:IFPEEK(734)=131T
HENPOKE749,0:FORT=735TO749:IFPEE
K(T)<>0THENA$=A$+CHR$(PEEK(T)):N
EXTELSEPRINT@256,"SAVING PROGRAM
":PRINT"NAME: "A$:POKE65494,0:VE
RIFYON:SAVEA$:VERIFYOFF:POKE6534
4,0:FORT=1TO300:NEXT:POKE734,0:R
UN
```

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

Basketball Statistics Package Keeps Stats In Check

Basketball Statistics Package will allow a person to keep all of the statistics of a basketball team and its opponents. The package comes with a 12-page instruction manual and an unprotected diskette. The absence of protection lets the user easily copy his program to prevent the loss of a valuable program.

To start the program, all one has to do is type `RUN "BASKET"`. From there, all he has to do is select the option he wants from the menus and enter the stat requested. The options from the main menu are: start a new player's stats, add to a player's stats, two similar options concerning opposing teams, review or correct stats, add new players, print stats or print team summary. A player's stats include his number, name, opposing team, quarters played, time played, field goals attempted, field goals made, free throws attempted and made, assists, post and feed, offensive and defensive rebounds, turnovers, personal fouls, and recovery and steals.

I must admit I am not a big basketball fiend, but it seems this package has about every possible statistic available. The opposing stats are not as extensive, but include all of the needed information. The correction of a stat is extremely easy with this program. There are two kinds of prints; one is that of a player and the other is that of the team. Each is thoughtfully and neatly formatted, giving all of the information stored on the player or team.

I think only the most avid fan will desire to key in the statistics for an entire game, but "fanatics" and coaches alike will find *Basketball Statistics Package* an excellent program.

(Sugar Software, 1710 N. 50th Avenue, Hollywood, FL 33021, 32K disk $29.95 plus $1.50 S/H)

— Jim Sewell

Dimensional Figure Drawing With *Lissajous Art*

Lissajous Art is designed to draw a lissajous figure in either two or three dimensions. The explanation of a lissajous figure given in the documentation, which accompanies the program, is that of a figure traced by an oscillating pencil. The program requests settings for various details of the X, Y and Z coordinates. They are frequency, amplitude and phase. It also asks for resolution and friction, which are not explained in the documentation, but are fairly straightforward.

After receiving these variables, *Lissajous Art* draws a figure in your choice of two or three dimensions. In my experimentation with the program, I used mainly 3-D, although to the untrained eye it looked remarkably flat. There is also a routine that allows you to print the figure you draw, provided your printer is capable. Mine isn't, so I can't tell you anything about the way the hard copy routine works.

The program comes with an "as is" warranty, the company guaranteeing only that it will load, which mine did quickly and easily. Documentation is adequate, with the exception of the resolution and friction descriptions.

Although I can see little practical use for *Lissajous Art*, it does have good entertainment value if you enjoy experimenting with different variables. It is not the type of program I would purchase, but I am sure there are many who would find it most enjoyable.

(Tothian Software, P.O. Box 663, Rimersburg, PA 16248, cassette $19.95)

— Stephen Bream

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Jutta and I share a CoCo here at RAINBOW. She calls him "Cookie" and what I call him can't be printed — he likes her best; always has. But Cookie has been a lot friendlier lately since I gave him the No-Stat II from Amber Enterprises.

No-Stat II is an anti-static pad made of inert conductive foam which is laminated to a tufted fabric. It is flame retardant and non-allergenic. Measuring 11 by 15 inches, it collects a lot of dust that sooner or later might endanger Cookie's sensitive IC chips. (I know of these only through Tony DiStefano's column, but I have a lot of respect for them.) No-Stat II has also stopped the nasty little zingers our tough Cookie packs for me when I shuffle over the carpet to his keyboard instead of picking up my feet.

I'm glad I gave No-Stat II to Cookie because the "CoCo Gallery" entries I review on him each month are important to me as well as a source of delight to the entire office, and I need Cookie to cooperate. He seems to be behaving better toward me and I can only credit that fact to No-Stat II (it's the only present I've ever given him).

No-Stat II pads also come in a 28 by 28-inch size, and I'm thinking of ordering one for "Sulu," the Tandy 1200 HD I use. (He's *my* friend!)

(Amber Enterprises, P.O. Box 7439, Greensville, SC 29610, small size $5.95, large size $19.95)

— Monica Dorth

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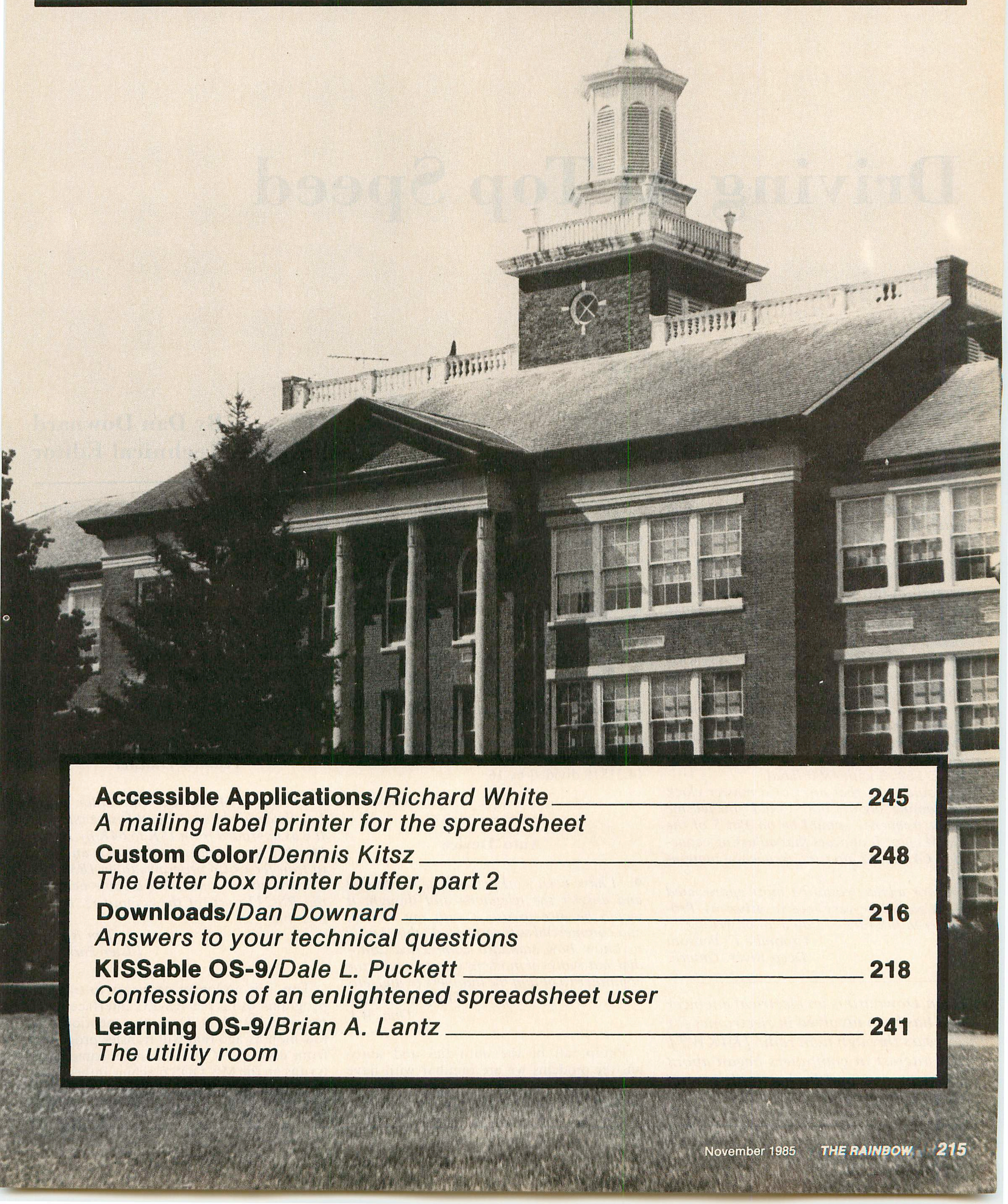

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RAINBOWTECH

DOWNLOADS

Driving At Top Speed

By Dan Downard
Rainbow Technical Editor

• *I am getting very frustrated about Baud rates. I have a type 1 CoCo Revision F (which I think is also known as NC) with a C. Itoh Prowriter 8510 and I principally run* Telewriter-64. *I keep reading (and most recently in July's issue, Page 250) about how to* `POKE` *into 150 various values to change the Baud rate from 50 to 9600. However, the best I can get out of my CoCo is 2400 — there's no way it will run any faster! I've tried every value from 17 down to one with both 4800 and 9600 on my Prowriter (you can imagine how long this took!) and the printer usually produces garbage — the best I've ever gotten is mixed wide and narrow text all over the page using a combination of* `POKE 150,6` *with 4800 Baud.*

Could it be that my CoCo master clock is running slightly out? Could you tell me what frequency should be on Pin 5 of the SAM chip? It appears that adjusting capacitor C4 should alter the frequency marginally.

Your advice would be most appreciated — it would be very nice to drive my Prowriter at full rate — I do a lot of writing.

Croombe F. Pensom
Deep River, Ontario

You seem to think the problem is in the CoCo, Croombe. The same type of oscillator is in the Prowriter, too. Any RS-232 driver requires a clock for timing. A few months ago we even had to adjust the clock in our serial to parallel converter here at THE RAINBOW. The RS-232 standard has a fairly wide speed tolerance and the Baud rate constant should not be that critical.

To answer your question, the frequency on Pin 5 of the SAM chip should be 14.31818 MHz. This frequency can be adjusted by trimmer capacitor C43 on the CoCo. Assuming that you are not using any speed-up pokes, the frequency on Pin 14 of the SAM chip should be .894886 MHz, or 14.31818 divided by 16.

'Auto' Device

• *I have been working on a device to dial and answer the telephone and thought it would be nice to use it with my modem and commercial software. To do this, I need to know how standard commerical auto-dial, auto-answer modems interface with the computer to obtain the numbers to dial, etc.*

Philip E. Beheler
Ona, WV

Philip, all of the auto-dial and auto-answer modems we are familiar with have a dedicated microprocessor inside the modem. The only interface to the computer is by means of an RS-232, or serial, interface.

For example, with a Hayes Smartmodem you just send ATD5551212 to the modem. The 'A' puts the modem in the command state, the 'T' tells the modem to use touch-tone dialing, and the D5551212 forces the originate mode and dials the number.

I don't know of any standard for this information, other than the fact that many companies advertise their products as Hayes compatible.

Tedious Transfer

• *I have a 64K CoCo with Color BASIC 1.1, Extended BASIC 1.1 and Disk BASIC 1.0. It was upgraded from 16K to 64K by Radio Shack. I was wondering if there is any way to transfer CoCo programs to an IBM PC. I heard about connecting a cable between the RS-232 ports of the computers. Is this possible?*

Tim Richter
Ulster Park, NY

Tim, it is no longer necessary to transfer programs using the RS-232 interface. One program by Mark Data was mentioned a few months ago that will transfer programs from disk. [*COCO-UTIL* is its name, and it runs on the MS-DOS machine rather than the CoCo. Essentially, it causes one of the MS-DOS drives to function like a CoCo

(Dan Downard is an electrical engineer and has been involved in electronics for 25 years through ham radio [K4KWT]. His interest in computers began about six years ago and he has built several 68XX systems.)

drive; by using *COCO-UTIL*, you can even initialize CoCo disks right on the MS-DOS machine. So, if you have, say, an IBM at work and want to take a data file home to run on the CoCo, you're in business.]

I recently received a flyer from D.P. Johnson stating that he, also, has a program for the tranfer of IBM disk files to the CoCo. This version runs under OS-9 and you must have *SDISK* to use it. [*PC-XFER Utilities* will read/write and format MS-DOS diskettes on the CoCo, under OS-9, as well as transfer files between Disk BASIC and OS-9.]

While they will transfer binary files, these programs are most useful for ASCII files, not programs, as the microprocessor in the IBM PC is different from the CoCo. You may be able to convert some BASIC programs, but it will be tedious.

Editing for the ASCII-ing

- *I have several cassette-based word processors, including the original version of* Telewriter.

I have been told that it is possible to `CSAVE` *a program in ASCII form (*`SAVE-"filename",A`*) and read it into a word processor so as to edit the program more easily, then when the editing is complete, retrieve it again so it may be* `CLOAD`*ed and* `RUN`.

Is this true? If so, how is it done? I have tried on several occasions using different word processors, with no success.

J. Linder
Lake Carmel, NY

Jeff, I don't know of any word processor, besides the original version of *Telewriter*, that does not save files in an ASCII format. ASCII files was one of the improvements when *Telewriter-64* was introduced.

You save a BASIC program in ASCII just as you mentioned: `CSAVE"filename",A`. You can then read this file with any text editor, or word processor, and modify it.

One hint: Be careful that your lines aren't over 256 bytes long or the BASIC buffer will overflow. To load the file back into BASIC just use the `CLOAD` command, no `,A` is required.

BBS on a One-Drive Budget

- *I am interested in setting up a BBS and need some help. I know it is necessary to have an auto-dial/auto-answer modem, but, is it necessary to have two or more drives? Can a system be run effectively and efficiently on one drive? I know of many software programs for running a BBS.*

Also, the new J&M controller with JDOS 1.2 — the parallel port it contains — does this require an interface? I really want to set up a BBS, but if more than one drive is needed then I guess I'm out of luck.

Bob Mowery
Robinson, PA

Bob, the *RainBoard* BBS, originally published in the November 1983 RAINBOW, is a single-disk bulletin board.

There are a couple of reasons two drives are preferred for a BBS. Conservative operating practices call for all of the actual BBS programs to be on a write-protected disk, usually in Drive 0. This prohibits accidental erasures of programs by users.

The other reason is that most BBSs have large databases; usually too large to fit on a single drive by the time you consider this disk has to also store the BBS programs. The larger bulletin boards have several drives, even hard disks, to provide adequate room for the database.

With some of the rumors I've been hearing about 512K upgrades, though, I suppose very shortly you will be able to have a tape-based BBS if you have enough memory.

Expanding on the Family 'String'

- *I enjoy reading your articles in* RAINBOW, *but I think you missed the point in Rodney Gibbons' letter in the September 1985 issue of* RAINBOW *(Page 236).*

He wants more string space to store additional personal data. The easiest way is to eliminate unnecessary arrays. His example of three arrays with 200 elements each requires over 3,000 bytes just for variable pointers (5 x 200 x 3) and doesn't allow for any data! Only one array of 200 elements requires 1,000 bytes of variable pointers — a savings of 2,000 bytes.

In order to do this, he must pack the information that is in the three arrays into one. The data in A$(1), B$(1), C$(1) would be packed into A$(1) with a unique separator between each element. Let's assume the array A$ is name, B$ is address and C$ is city. Let's select a separator — I like `CHR$(255)` *since it displays a full orange block. Subroutines are needed to combine the elements and separate them.*

The combined routine is very easy: A$=N$+C$+AD$+C$+CS$ where A$ is the combined data ready to stuff into an array, C$ is `CHR$(255)`, *AD$ is address and CS$ is city. The split routine is a little more complex, but using* `INSTR` *and* `MID$` *simplifies the task.*

The combined routine illustrates another technique. Keep repeated variables or constants short. If `CHR$(255)` *is used 25 times in a program it takes up seven bytes each time it is used, while C$ only requires two — a savings of 125 bytes. Long constants that are used more than once can be set equal to a variable, which also saves storage. Frequently used variables should be one character instead of two, a one byte savings for each time used. A defined constant does not use string space unless two strings are concatenated. A$="help" requires no string space while A$=B$+C$ does.*

Here's another example of multiple arrays that use up a lot of memory. Let's assume we have defined only one string array — A$(200) for name and two numeric arrays, F$(200) for father, M$(200) for mother. The numeric arrays contain an index into the A$ array for the parents' name.

	A$	F	M
1	John	0	0
2	Mary	0	0
3	Paul	1	2

In this example, John and Mary's parents are unknown, but Paul's father is John and his mother is Mary. Looks good? OK, let's only use one array and pack it. We eliminate arrays F and M and save 2,000 bytes for string space. The combined routine looks like this:

A$=N$+C$+STR$(F)+C$+STR$(M)
or
A$=CHR$(F)+CHR$(M)+N$.

In the example, A$ is the packed string, N$ the person's name, F is the father's index and M is the mother's index. The first example requires a minimum of six bytes for the two pointers and a maximum of 10 bytes. The second example requires only two bytes for both pointers and works up to an index of 255. The split routine is also very simple.

Conserve string space. When you are finished with a string variable, null it (A$(100)="").

If you have a disk system, not using graphics and need only one file open at a time, then `FILES1` *will save 256 bytes. You can still use multiple files but only one at a time.*

Instead of writing one program that does everything, write two or three that do unique functions. One program could build relationships, another to display relationships, etc. This works well on disk but can become a bit clumsy with a tape.

Other techniques are to eliminate comments, unnecessary spaces and line numbers. They all take up memory.

At least two vendors have products that can help. One of them allows variables to be in page one of a 64K machine and the other one moves BASIC *up to allow more work space for* BASIC.

On a final note: When working with large string space, the monster arises in the still of the night and locks up your machine! I had one sort for 600 elements take 45 minutes only because string space was too small; I did not figure out the problem for two months. This ugly monster is the garbage collector and there are several programming techniques that will tame it — but, that is another subject.

Dave Clark
St. Louis, MO

Thanks for the sharing your expertise with our readers, Dave. Letters like yours are the backbone of the CoCo Community, and THE RAINBOW.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

KISSable OS-9

Confessions Of An Enlightened Spreadsheet User

By Dale L. Puckett
Rainbow Contributing Editor

November promises to be a big month in the OS-9 world. Jeanne and Ken Kaplan at Microware say the Microware Seminar, November 1-4, will be bigger than ever. They are especially proud of a Special Interest Seminar featuring news, tricks and treats for the CoCo OS-9 crowd. The tab is $150. If you're reading this in late October the number to call is (515) 224-1929. Tell Jeanne, "KISSable OS-9" sent you.

November is a month for Thanksgiving, so before we jump into all the technical mumbo jumbo I would like to take time to thank each of you who have contributed short procedures and program listings during the past year. Thank you also to all who have written with questions — you guide this column.

And finally, to the many OS-9 vendors, thank you for telling us about your product early — and for all the hardware, information and Beta-test software you've shared. We try to give everyone equal time and we try to be first with product news. We sincerely hope our enthusiasm for your products has helped you prosper. If you haven't seen anything about your product, it's probably because we haven't seen it. If you have hot news, feel free to contact me directly at 6516 Hillside Lane, Alexandria, VA 22306.

Getting Started with *DynaCalc*

It's time now for True Confessions. I've worked with microcomputers since the Southwest Technical Products 6800 machine was introduced. I've learned a little BASIC and taught myself assembly language programming, but in the past when a person showed me a spreadsheet I would panic. I don't know what caused my mental block, but fortunately everything changed when I had to sit down and convert a spreadsheet at work. Our branch manages the Pollution Response Program for the entire Coast Guard and this means we manage the resources of the national strike force. The three strike teams send in data each quarter that fits nicely in a spreadsheet.

Recently, we decided to start collecting the same type of data about the Public Information Assist Team I supervise. The idea was great but the information was different. This meant I had to learn to edit a *Multiplan* spreadsheet. After a quick glance at the book and a few experiments at a Coast Guard C-3 standard terminal, I actually made it work.

Now for the good news. The experience with *Multiplan* made me brave and I came home one night and dived into *DynaCalc*. Guess what? It's just as easy to run, just as fast and just as powerful. And most importantly, since we have been preaching that "OS-9 needs excellent application programs" for months, yet only writing about system programs and languages, I decided it was time to delve into this aspect. So, this month "Dale does *DynaCalc*."

Comments from Joe Turner

DynaCalc is very easy to use. In fact, it's so easy to use that Joe Turner at Computer Systems Center in Chesterfield, Mo., rarely gets any calls. Unfortunately, that changed shortly after Tandy released the OS-9 version of *DynaCalc* for the Color Computer. Yet Joe has only had to answer one question: "Why doesn't *DynaCalc* work right with the *Word-Pak* 80-column card from PBJ?" The solution: Contact PBJ and have them send you Version 3.1 or higher of their OS-9 *Word-Pak* drivers.

The problem is in the getstat call, which reads the screen size. The original Color Computer OS-9 didn't have one, but when Frank Hogg designed the drivers for his Hi-Res screen, he added it. Later, he worked closely with PBJ's software wizard Ed Bender to standardize the call. The result is Hogg's *DynaStar* text editor works automatically and equally well using a Hi-Res screen or a PBJ 80-column card.

DynaCalc needs an erase to end of line code, a cursor on and off code, and a screen size call. That's one of the reasons OS-9 Version 1.01 was released. But unfortunately, when Tandy implemented the getstat call and the clear screen call they did it differently, i.e., the code is in the 6809's B Register instead of the A Register or vice versa. Also, an

---

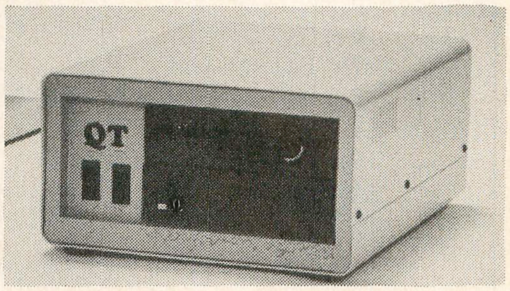
(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He is the author of The Official BASIC09 Tour Guide, *published by Microware and co-author, with Peter Dibble, of* The Official Rainbow Guide to OS-9, *published through the Rainbow Bookshelf. He serves on the InfoWorld Software Review Board and is a chief warrant officer in the U.S. Coast Guard.)*

NEWS RELEASE
October 1st, 1985

NEW QT Plus multi-user computer

*** Available for Immediate Delivery**

Frank Hogg Laboratory announced their new **QT Plus** computer system today. The **QT Plus** computer joins FHL's standard **QT** computer system as part of their product line. The **QT Plus** is the second 68000 based computer system the company has released this year.



The QT Plus differs from the standard QT in several ways:

68000 running at 10 mhz vs 68008 running at 8 mhz.
16 bit data bus vs 8 bit data bus
512K RAM standard vs 128K
Up to 128K ROM vs 32K
Supports 4 floppys vs 2 floppys

The **QT Plus** adds these features:

Expandable to 1 meg with an additional board. Buffered I/O expansion port with 32 addresses. The I/O is of the style of the SS 30 bus with 8 data, 5 address, interrupt, R/W, select, reset and E lines. The I/O bus itself is an inline 34-pin connector on the main board. For example the 32 addresses could be used with 16 serial ports (ACIA's) or 8 parallel ports (PIA's) or any combination.

The **QT Plus** uses a Multi-Level Interrupt Structure for improved I/O.

The **QT Plus** with 512K costs $500 more than the standard QT with 128K.

QT 1	128K single floppy drive	$1595
QT Plus 1	**512K single floppy drive**	**$2095**
QT 2	128K dual floppy drive	$1750
QT Plus 2	**512K dual floppy drive**	**$2250**
QT HD	512K one floppy, one 10 meg hard drive	$2695
QT Plus HD	**512K one floppy, one 10 meg hard drive**	**$3195**
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QT Plus	512K expansion board for 1 meg total RAM	$395

All QT systems include the operating system, OS9/68K with all utilities and RAM disk, Basic09 and Runb, Stylo word processor, mail merge and spell check, and the Dynacalc spreadsheet program! Over $2000 of bundled software is included in the system!

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offset may be different. Since the Color Computer version of *DynaCalc* was written for the Tandy drivers, it does not work properly with earlier versions of the *Word-Pak* software. Give Al at PBJ a call for the latest version of the *Word-Pak* drivers.

About the only other question Turner gets concerns the missing /o command that is available in other versions of *DynaCalc*, but not the Color Computer. And, there's a good reason — the command isn't needed because of OS-9's unified I/O. On the Color Computer, if you want to save a listing of the spreadsheet, you just print it to a file. You do this by typing `/spc`, which closes the OS-9 output path to your printer device descriptor /p. Then, the next time you type `/p` to print a spreadsheet, *DynaCalc* will ask for a filename. After you open this path, *DynaCalc* will send all printouts to a file until you type `/spc` again to close the file. That's the way the four listings featured in this column were produced.

The present version of OS-9 *DynaCalc* does not have graphics. Will it in the future? Probably not. Will you be able to produce graphics from the *DynaCalc* spreadsheets in the future? Probably yes. How? By executing the code in a new *DynaCalc* filter module. You will most likely see a filter that reads its input from a standard OS-9 data file output in text form by *DynaCalc*. Its output will most likely produce charts and graphs on a standard Color Computer OS-9 graphics screen. Of course, when OS-9 Level II hits the CoCo there will be enough memory available to let you run this filter from

Figure 1

```
   [   A   ][   B   ][   C   ][   D   ][   E   ][   F   ][   G   ][   H   ]
 1-Demonstration of logical comparison operators.
 2-
 3-        0         Note that operators work with character strings
 4-        1         as well as with numbers.  Change the contents of
 5-                  A3 and A4 and watch the results below.
 6-
 7- False   =
 8-
 9- True    <>
10-
11- True    <
12-
13- False   >
14-
15- True    <=
16-
17- False   >=
```

Figure 2

```
   [    A    ][B ][         C         ][  D  ][  E  ][  F  ][  G  ][  H  ][  I  ]
 1-       Household expenses by cateory . . . shows use of labels with @IF.
 2-    amount    payee              cat           food  cloth  house   util   misc
 3---------------------------------------------------------------------------
 4-     65.00    Union Electric     util                          65.00
 5-    125.58    Dierberg's Market  food    125.58
 6-     37.88    Super Stitches     cloth          37.88
 7-    147.00    Starr Coffee Co.   food    147.00
 8-     49.50    Laclede Gas Co.    util                          49.50
 9-     79.67    Famous-Barr Co.    cloth          79.67
10-    122.00    Forum West Condo   house                 122.00
11-    140.25    Dierberg's Market  food    140.25
12-     40.00    Bernard Accardi    misc                                 40.00
13-     31.25    Continental Cable  misc                                 31.25
14-    140.24    Resler Optometry   misc                                140.24
15-     46.49    9-0-5 store #23    food     46.49
16-     51.00    Nathalie Levine    misc                                 51.00
17-     34.00    Steve Bise         misc                                 34.00
18---------------------------------------------------------------------------
19-   1109.86    totals                   459.32 117.55 122.00 114.50 296.49
20-                                                                         ok
21-          ok  bad
```

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Figure 3

```
   [   A   ][   B   ][             C              ][   D   ][   E   ][   F   ]
   1-date     ck #     payee                        ck amount deposit balance
   2-----------------------------------------------------------------------------
   3-03/04             Starting Balance                                   0.00
   4-03/04                                                     250.00   250.00
   5-03/05    2140     Matteker's Market               67.00            183.00
   6-03/05    2141     Karstev's Fashions              63.00            120.00
   7-03/05    2142     Ann's Cameo Shop                87.90             32.10
   8-03/05    2143     Roy Alu Tailor                  23.00              9.10
   9-03/08                                                     687.00   696.10
  10-03/10    2144     Opera Theatre                   43.00            653.10
  11-03/10    2145     9-0-5 store #23                 87.98            565.12
  12-03/10    2146     Steve Bise                      12.03            553.09
  13-03/10    2147     Sports Page                     10.00            543.09
  14-03/10    2148     Barrett Florist                 12.00            531.09
  15-03/11    2149     Dierberg's Market              100.00            431.09
  16-03/20                                                    1000.00  1431.09
  17-04/01    2150     Mark Twain Parkway Bank        500.00            931.09
  18-04/01    2151     Carefree West                   22.50            908.59
  19-04/01    2152     St. Louis County Library         3.50            905.09
  20-04/01    2153     Decor Furniture                259.95            645.14
```

within *DynaCalc* using the built-in system execution command. Again, that's one of the features that makes the OS-9 operating system shine.

Before we look at several *DynaCalc* examples let's see if we can get you off to a good start psychologically by borrowing a philosophy used on Apple's Macintosh. Essentially, every command in a Macintosh menu is a verb. It doesn't matter what you are doing, you run every program the same way. First, you select something — a character, a word, a sentence, a spreadsheet cell or an entire row or column, then what you do is determined by the action verb in the menu.

I found that thinking about *DynaCalc* in this manner made it very easy to understand. In a nutshell, you point to a cell by moving the cursor around with the arrow keys. Then, do something to it. Sometimes you type in original data, sometimes you type in an expression or formula and other times you just change the value of the variable stored in the cell selected.

Since *DynaCalc* is versatile, it lets the user enter data in many ways. For example, you can move to a cell by pressing the arrow keys until the cursor arrives at your destination. Or, go directly to a cell by using *DynaCalc's* GoTo command, the '>' character. Or, if you don't remember the row column address of the cell, but do remember what it contains, you can use a special command to look for the contents and move the cursor to it automatically.

When *DynaCalc* needs parameters, you can communicate them in several different ways. For example, when you want to find the total value of a column of numbers, you may arrive at the answer following several paths. Pick the approach that makes sense to you. The first time I tried to run a spreadsheet, I went to the cell where I wanted to hold the total and typed `+A1+A2+A3`, etc. Believe me, that's the hard way but it works if you don't mind the grunt work.

Enter a standard *DynaCalc* function @SUM. Now, I go to the cell where I want to store the total and type `@SUM(A1 . . . A14`. And, you only need to type the first period; *DynaCalc*

Figure 4

```
      [   A   ][   B   ][     C     ][   D   ]
      1-DEMO_NPV   Net Present Value Demonstration
      2-
      3-Discount rate (%)           11.00
      4-
      5-Initial outlay           -7500.00
      6-
      7-Payback - - Year 1        1250.00
      8-Payback - - Year 2        2000.00
      9-Payback - - Year 3        2000.00
     10-Payback - - Year 4        2000.00
     11-Payback - - Year 5        4000.00
     12-
     13-Net Present Value          403.02
```

Listing 1a:

```
t
tmode .1 -pause
load dir
rename /d0/cmds/dir Dir32
debug dir <DirScript
 save temp dir
```

```
unlink dir
verify u <temp >/d0/cmds/Dir
attr /d0/cmds/dir e pe
del temp
tmode .1 pause
-t

***********************************
```

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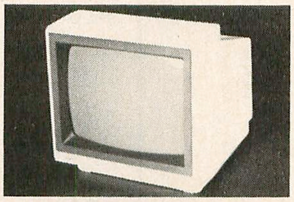

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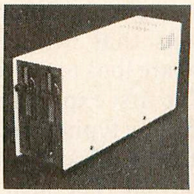

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adds the other two periods in the ellipse.

However, there's an easier way. To type the expression mentioned, I had to know that my data started in the cell named "A1" and ended in the cell named "A14." It's easier to point to the cell where you want to store the result and type `@SUM(`. Then, move the cursor until it points to the first cell you want to add in the total and hit RETURN. Now, move the cursor until it points to the last cell in the range and hit RETURN. If you still can't believe the magic, look at the left end of the second line on your *DynaCalc* screen. Notice the expression you just "typed?" Amazing!

Turner gave us permission to print several sample spreadsheets that are supplied on the disk with larger OS-9 systems. After studying them for a few minutes, you'll be amazed at what can be done with a spreadsheet. In Turner's words, "It bears repeating. People that are programmers can knock out a program fast. But, they can often solve the same problem much faster on a spreadsheet."

Our first listing shows how you can make logical comparisons with a spreadsheet. The cells in Column A contain expressions that evaluate as true or false. You are looking at the result in the listing. The first expression was entered into the cell by typing, `+A3=A4`. A quick glance at cells A3 and A4 confirms the value reported. The next expression in the column was entered by typing `+A3< >A4`. Note that the Equal sign and the greater-than less-than operator in Column B are merely labels — they are simple ASCII text. To enter the equal sign, merely point to the cell and then type =, etc.

Speaking of ASCII text, *DynaCalc* has a feature that beats the socks off *Multiplan*. Notice the message telling about the operators. It is stored in a number of different cells all the way across the screen. On *Multiplan* you had to type the first cell, move to the second and pick up typing the word in the middle, then move again, until reaching the end of the line. With *DynaCalc*, point to the cell where you want to start your message. Then, type `/A` for attributes, followed by `/L` for label. Now, type the entire message at one time. *DynaCalc* will automatically enter the proper characters in each cell.

The spreadsheet that demonstrates *DynaCalc's* @IF function is amazing. Look in the first row of data. The expression that generated the $65.00 in Column H is @IF(D4=H2,A4,A20. *Let's study this.*

Listing 1b:

```
1 dir
. .+3
=A9
. .+4
=83
1 dir
. .+37
=4E
=41
=4D
=45
=20
=20
. .+2
=20
=20
=20
=20
. .+5
=20
=20
=20
=20
=20
. .+6
=20
=20
=20
=20
=20
=20
=41
=54
=54
=52
=20
=20
=20
=53
=54
=41
=52
=54
=20
=20
=20
=20
=20
=20
=53
=49
=5A
=45
=0A
=0D
=20
=20
=20
=20
=20
=0D
=0A
1 dir
. .+137
=32
. .+3
=10
. .+35
=01
=22
1 dir
. .+295
=34
=04
=D6
=08
=C0
=5C
=C1
=32
=27
=05
=17
=FF
=3D
=20
=F3
=35
=84
q
```

```
*************************************
```

Listing 2a:

```
t
tmode .1 -pause
load mdir
rename /d0/cmds/mdir Mdir32
debug mdir <MDirScript
save temp mdir
unlink mdir
verify u <temp >/d0/cmds/Mdir
attr /d0/cmds/mdir e pe
del temp
tmode .1 pause
-t
```

```
*************************************
```

Listing 2b:

```
1 mdir
. .+C1
=32
. .+3
=10
q
```

```
*************************************
```

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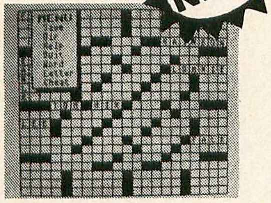

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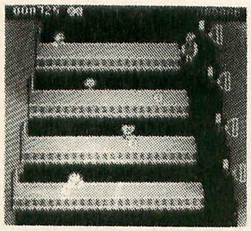

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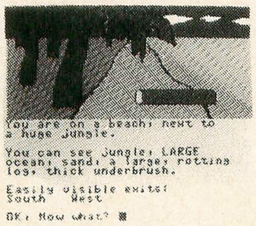

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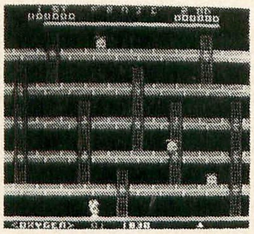

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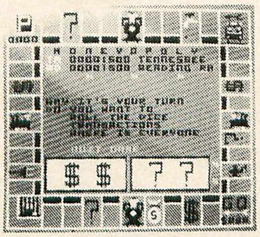

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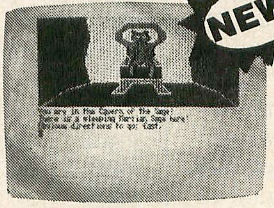

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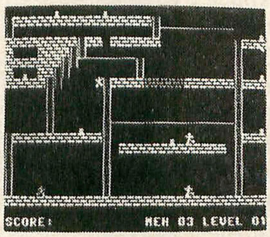

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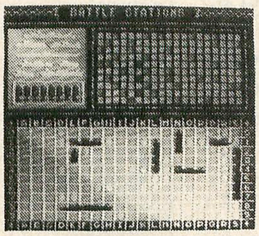

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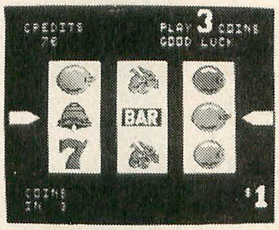

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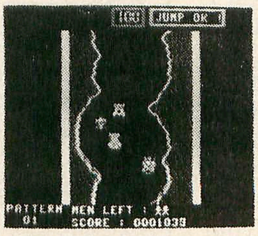
6 games



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D4 contains the label "util." Now look at Cell H2. It also contains the label util. Since the expression D4=H2 evaluates as true, *DynaCalc* stored the value of Cell A4 — or 65.00 in Cell H4. If the expression had been false, *DynaCalc* would have stored the value of Cell A20 in Cell H4. When we look closely at Cell A20 we see that it contains a label — in this case, a blank space.

To help you fill out your spreadsheet, Cell E4 contains the expression @IF (D4=E2,A4,A20. In English, it reads "If Cell E2, which contains the type of expenditure, contains the word "food," we will store the value of the money spent, Cell A4 here. Otherwise, we will store a blank space." Since Cell D4 contained util and util is not equal to "food," *DynaCalc* stored a blank space in Cell E4. By the way, Cell A19 contains the expression @SUM(A3 . . . A18. The other totals in this row contain similar expressions with only the column address changed. I'll leave it up to you to write the expression in Cell I19 that checks to see if the total in A19 is the same as the sum of the totals of the individual categories.

Our third listing shows how to set up a spreadsheet to keep track of your checkbook. All of the columns except the last contain values. The first three are labels. The next to last two contain numerical values that someone has entered. The calculation takes place in the last column. For example, Cell F4 contains the expression F3+E4-D4, Cell F5 contains F4+E5-D5, etc. In English, the sentence would read "Our balance is equal to the balance in the row above plus the value of any deposits made minus the balance of any checks written." The author used *DynaCalc's* replicate command in relative mode to enter the expressions in cells F5 through F20.

The final listing shows how easy it is to calculate Net Present Value using *DynaCalc*. Everything in Column A is a label. Everything except the last cell in Column B contains a value entered by the operator. The calculation is done by the expression typed in the last cell in the column, C5+@NPV(C3/100,C7 . . . C11. Now, pull out one of your BASIC text books and look at the BASIC program that's needed to type in when you want to make the same calculations. Which is easier?

Thunder RAM Breaks the Speed Barrier

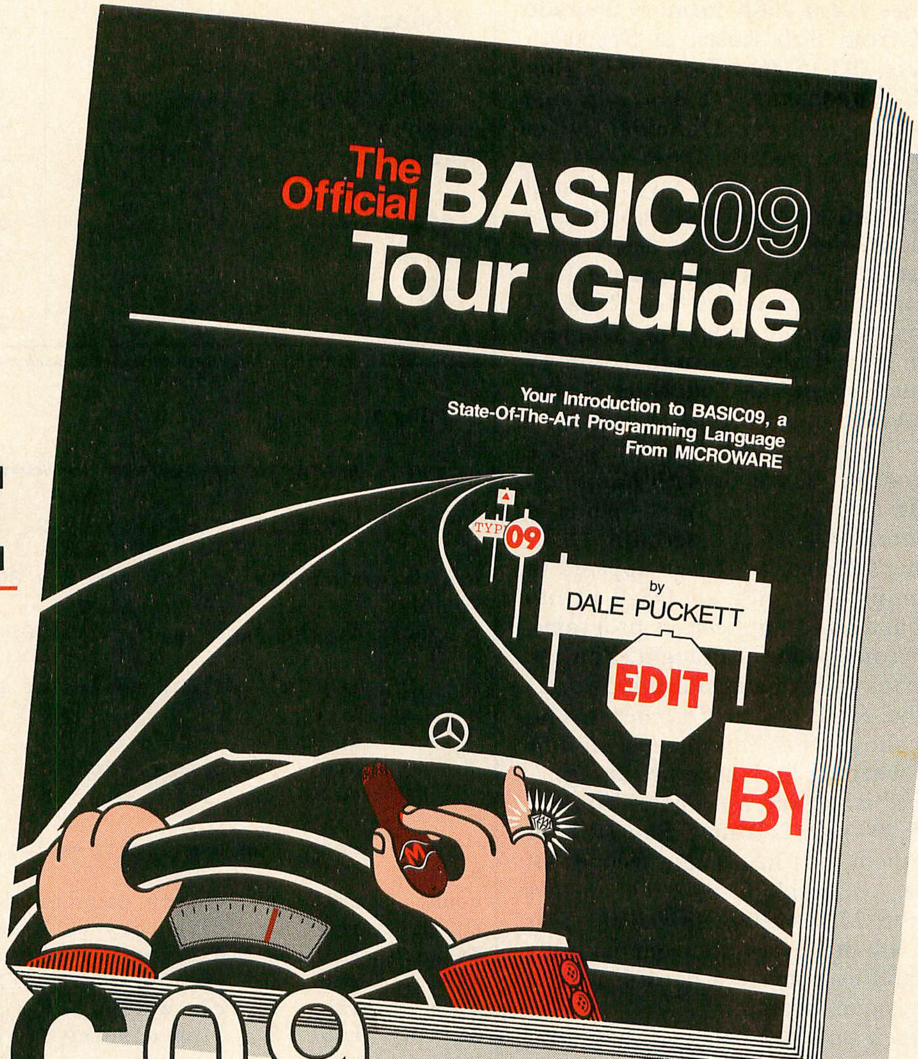
The performance of my CoCo has literally skyrocketed. I installed a

Listing 3:

```
PROCEDURE pixscroll
 0000      (* procedure to search a dir for graphic pictures *)
 0034      (* and then to scroll thru them on the screen *)
 0064      (* by Mark W. Smith *)
 007A
 007B      (* all pix should be copied to OS9, e.g. xcopy *)
 00AC      (* save them with an ext of '.pix' *)
 00D1      (* call pixscroll with a pathname :  pixscroll("/d1/PIX") *)
 010D      (* requires Tim Harris' 'd' utility *)
 0133      (* see the RAINBOW Guide to OS9 book for the source *)
 0169
 016A
 016B      PARAM pixdir:STRING[255]
 0177
 0178      DIM pixname:STRING[29]
 0184      DIM cr,char:STRING[1]
 0194      DIM offset,pixel,dirfile,pixfile,errnum:BYTE
 01AB      DIM delay:REAL
 01B2      DIM gfxmem:INTEGER
 01B9
 01BA      cr:=CHR$($0D)
 01C3      offset:=5
 01CA
 01CB
 01CC      ON ERROR GOTO 100
 01D2
 01D3 10
 01D7      CHD pixdir
 01DC      SHELL "d >pixlist.dir"
 01EE
 01EF      ON ERROR
 01F2
 01F3      OPEN #dirfile,"pixlist.dir":READ
 0209      SEEK #dirfile,0
 0212
 0213      WHILE NOT(EOF(#dirfile)) DO
 021E        pixname:=""
 0225        LOOP
 0227          GET #dirfile,char
 0231        EXITIF char=cr THEN
 023E        ENDEXIT
 0242          pixname:=pixname+char
 024E        ENDLOOP
 0252        IF LEN(pixname)>4 THEN
 025F          IF RIGHT$(pixname,4)=".pix" THEN
 0272            RUN gfx("mode",0,5)
 0284            RUN gfx("gloc",gfxmem)
 0295            OPEN #pixfile,pixname:READ
 02A1            SEEK #pixfile,offset
 02AB            WHILE NOT(EOF(#pixfile)) DO
 02B6              GET #pixfile,pixel
 02C0              POKE gfxmem,pixel
 02C9              gfxmem:=gfxmem+1
 02D4            ENDWHILE
 02D8            CLOSE #pixfile
 02DE            FOR delay=1 TO 7000
 02F1            NEXT delay
 02FC          ENDIF
 02FE        ENDIF
 0300      ENDWHILE
 0304      CLOSE #dirfile
 030A      RUN gfx("quit")
 0316      KILL "gfx"
 031D      DELETE "pixlist.dir"
 032C      END
 032E
 032F 100
 0333      errnum:=ERR
 0339      IF errnum=218 THEN
 0345        DELETE "pixlist.dir"
 0354        GOTO 10
 0358      ELSE
 035C        PRINT "OS9 error #"; errnum
 036F        BYE
 0371      ENDIF
 0373
```

****

Get the most out of BASIC09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Thunder RAM 256K memory upgrade board from Bob Rosen at Spectrum Projects, (93-15 86th Drive, P.O. Box 21272, Woodhaven, NY 11421, phone 718-441-2807) in my 'D' model CoCo. Frankly, I am amazed.

Thunder RAM is very easy to install and the entire project took less than a half hour. The software is also a snap to install, thanks to procedure files written by Brian Lantz. The 256K of memory available from the *Thunder RAM* gave Lantz enough room to emulate a single-sided, 40-track floppy disk. As Brian says in his documentation, "Anything you can do with a floppy disk, you can do with *RamDisk*. Instead of using /D0, use the name of the *RamDisk's* device descriptor, /R0."

Lantz's *RamDisk* driver appears to be compatible with all OS-9 utility commands and application programs. Here's some food for thought. You can even backup between your floppy disks and the *RamDisk* in *Thunder RAM*. We'll show what this means in time saved when we look at some timings.

Speed is the key word here. You can read 5,000 sectors from a *RamDisk*, or write them to it in a single second. Of course, you can't force 5,000 sectors into the 256K *Thunder RAM*. This speed will make floppies seem painfully slow and even make a hard disk look like it is gummed up.

There's only one catch. If the power goes out, you lose. The contents of your *RamDisk* will be lost. This means if you are using it to store data, you should copy files to a real floppy disk regularly.

Here's something else you can do with *Thunder RAM*. After using BACKUP to place a working disk in device /R0, put your boot floppy disk in Drive /D0 and hit the Color Computer's Reset button. After booting OS-9 again, type `CHX /R0/CMDS` and `CHD /R0`. Now, do a DIR. Your *RamDisk* will stay intact, even though you reboot with the Reset button. It's another feature that comes in handy and saves you a lot of time.

Ways You Can Use *RamDisk*

You can use a *RamDisk* in several different ways. One of the handiest is to make up a 40-track, single-sided floppy disk that contains the programs and system files you use all the time. As soon as you boot OS-9, format your *RamDisk* (it takes about five seconds) then use the BACKUP utility command to back up your floppy in the *RamDisk*. Next, use the CHX command to change your working execution directory to

Listing 4:

```
chd /d0/cmds
load dump
debug
ldump
. .+10d
=00
. .+17
=00
. .+05
=d7
. .+11f
=c4
=fd
=57
q
del dump
save dump
unlink dump
chd /d0
```

```
**************************************
```

Listing 5:

```
************************************************************
*
* DIR  -  COPYRIGHT (c) 1985 by S. B. GOLDBERG
*
* Replacement Dir utility for any 80 column screen.
*
* Syntax is the same as standard OS-9 Dir utility:
*
*    Dir [e] [x] [directoryname or pathname]
*
         ifpl
         use    /d0/defs/os9defs
         endc
*
         mod    len,name,prgrm+objct,reent+1,entry,dsiz
*
count    rmb    1    column counter
dpath    rmb    1    directory path number
dskpath  rmb    1    disk path number
mode     rmb    1    execution mode flag
dire     rmb    1    dir e flag
display  rmb    3    line display for dir e
owner    rmb    1    owner number digit
nowtime  rmb    4    owner number digit; start of time display
year     rmb    16    last mod. date
attribs  rmb    11    attributes
sector   rmb    9    starting sector
size     rmb    7    file size
szend    rmb    3
dentry   rmb    30    filename
mssectr  rmb    2    ms bytes descriptor sector number
lssectr  rmb    1    ls byte descriptor sector number
bytes    rmb    1    ls byte descriptor sector position
stuff    rmb    2    file descriptor data
who      rmb    1    ls byte of owner number
yr       rmb    6    last modified date
sze      rmb    4    file size
         rmb    200    stack
         rmb    200    parameters
dsiz     equ
*
*
name     fcs    /dir/
         fcc    /(c) 1985 S.B.GOLDBERG/
**********************************
*
* INITIALIZE
*
entry    pshs   x    save parameter pointer
         clr    dire    clear dir e flag
         clr    mode    clear exec. flag
         clr    bytes    clear ls byte descriptor sector position
         lda    #5    column count
         sta    count    save it
```

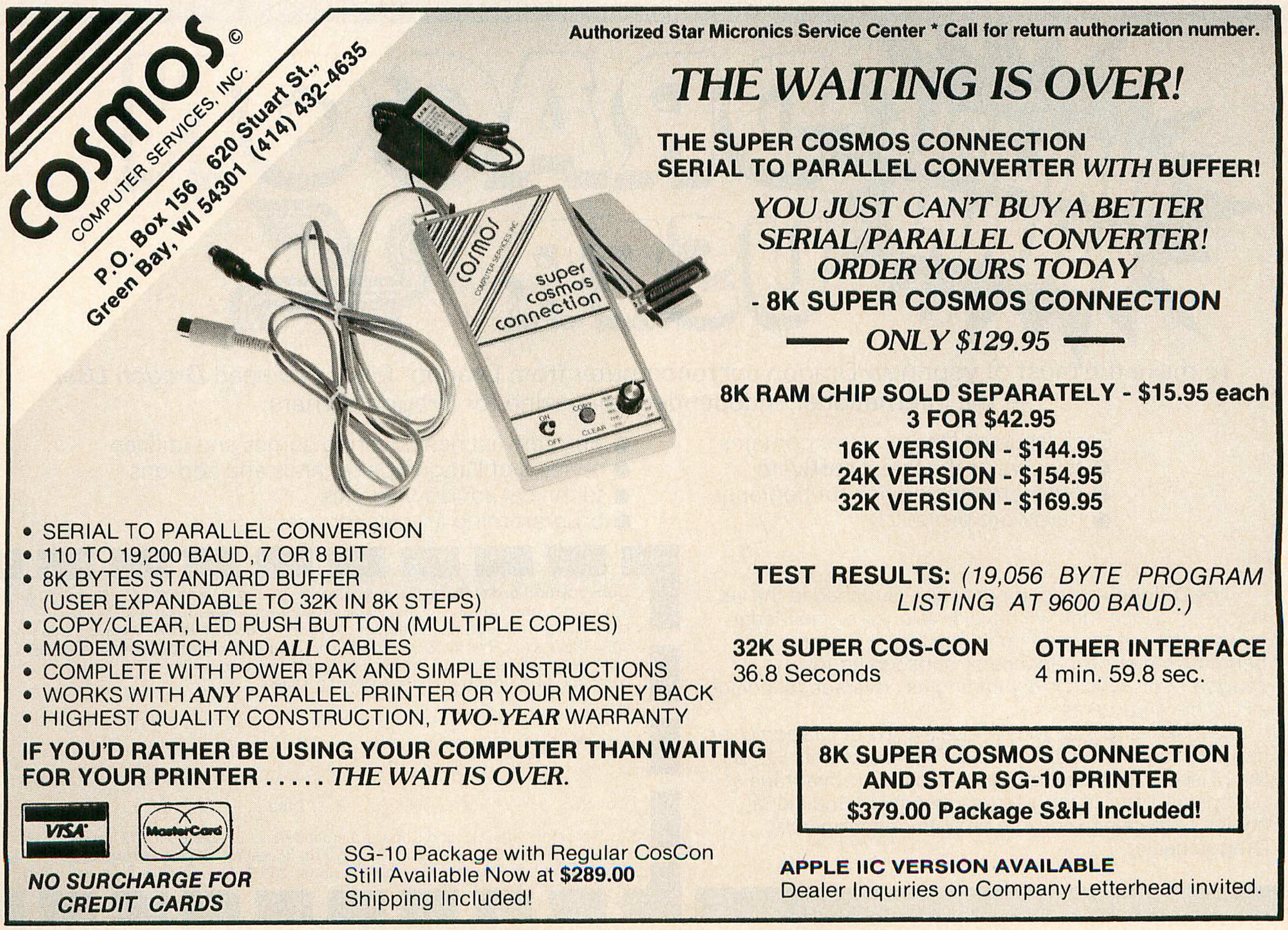
```
**********************************
*
* CHECK FOR OPTIONS ( X & E )
*
         bra   testopt   check for options e x
optloop  lda   ,x+   get option char.
         cmpa  #$0d   done?
         beq   findname   yes, go find dir. name
         cmpa  #$20   space?
         bne   optloop   no, look some more
testopt  ldd   ,x   get option chrs.
         cmpb  #$20   space?
         bhi   optloop   no, look again
         ora   #%00100000   make lower case
         cmpa  #'e   e ?
         beq   sete   yes, set dir e flag
         cmpa  #'x   x ?
         bne   optloop   no, look some more
         lda   #exec.   execute mode
         sta   mode   save it
         bra   clear   clear option
sete     inc   dire   set dir e flag
clear    clr   ,x+   clear option
         bra   optloop   look again
**********************************
*
* FIND NAME ON COMMAND LINE
*
findname puls  x   retrieve param. pointer
nameloop lda   ,x+   get param. char.
         cmpa  #$0d   directory name?
         beq   nodir   no, use current dir.
         cmpa  #$20   directory name?
         bls   nameloop   no, look again
```

/R0/CMDS. You won't believe it when you see the almost instant response to your commands on the screen. You won't know how you ever lived without it.

The other way to use the *RamDisk* is to hold temporary files generated by high level language compilers like OS-9 C and OS-9 PASCAL. Mike Bailey (Unified Software, 525 South Chestnut, Cameron, MO 64429), author of *The Last Word*, a mouse-driven editor for OS-9, is using his *Thunder RAM* in this manner and reports he is able to compile a C program three to four times faster than before.

To use the *RamDisk* like this, name the *RamDisk* as the current data directory with the CHD command and read the file you are compiling from a floppy disk. Or, copy the file you are compiling into the RAM disk and then compile it. In any case, it is always a good idea to edit your programs on the floppy disk. This gives you a way to start over if a program crashes or there is a power failure that wipes out the *RamDisk*. If you edit your programs and save them in the *RamDisk*, make sure you save them to a real floppy frequently.

I promised we would talk speed and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give some timing comparisons. It takes 56 seconds to back up and verify a 40-track, single-sided floppy disk to the *RamDisk* in *Thunder RAM*. When I did a DSAVE of the standard Radio Shack OS-9 CMDS directory from my original Tandy disk to the *RamDisk*, it took two minutes and 29 seconds. I then did a DSAVE of the same directory on a 40-track floppy disk in Drive /D0 to another in Drive /D1. This took six minutes and 37 seconds. By comparison, when I DSAVEd the same directory in *RamDisk* /R0 to a floppy disk in Drive /D1, it took four minutes and 58 seconds.

Other *RamDisks* on the Horizon

To be fair, we must mention several other hardware and *RamDisk* software now hitting the CoCo OS-9 market. D. P. Johnson, who revolutionized OS-9 on the Color Computer by writing *SDISK*, has introduced a new RAM disk cartridge that adds 512K bytes of memory to CoCo. Called "CCRD," it occupies four bytes of the 6809's memory map. Two of the bytes are used as a sector register to set the logical number of the 256 byte sector that will be displayed in a two-byte data window.

```
         bra   chngdir   yes, go ahead
nodir    leax  head,pcr   default, current dir.
************************************
*
* CHANGE DIRECTORY IF NEW DEVICE
*
chngdir  lda   ,-x   get first char. of pathname
         pshs  x   save address of pathname
         cmpa  #'/   new disk drive?
         bne   time   no, go ahead
         lda   #read.   maybe, better
         os9   i$chgdir   change the directory
         lbcs  out   exit with error
************************************
*
* SET UP TIME DISPLAY
*
time     leay  timeform,pcr   time display format
         leax  nowtime,u   data address for time display
timeloop lda   ,y+   get display char.
         sta   ,x+   put it in data area
         bne   timeloop   not done, repeat
         os9   f$time   get current time
         lbcs  out   exit with error
         leax  3,x   hour byte
         leay  year,u   time display address
         lbsr  setdate   set time display
************************************
*
* OPEN DIRECTORY
*
         ldx   ,s   get pathlist pointer
         lda   #read.+dir.   read directory mode
         adda  mode   add exec. mode if 'Dir x'
```

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```
         os9   i$open    open directory
         lbcs  out   exit with error
         sta   dpath   save dir. path number
         tfr   x,d   end of dir. name
         subd  ,s   subtract start of name
         pshs  d   save pathname length
         tst   dire   dir e?
         beq   header   no, put header on screen
************************************
*
* OPEN ENTIRE DISK FOR DIR E
*
         leax  at,pcr   address of @ (entire disk)
         lda   #read.   read mode
         os9   i$open   open disk
         lbcs  out   exit with error
         sta   dskpath   save disk path number
************************************
*
* PUT HEADER ON SCREEN
*
header   leax  head,pcr   start of header
         ldy   #15   length
         lbsr  print2   put start of header on screen
         puls  y   pathlist length
         puls  x   pathlist address
         bsr   print2   put on screen
         leax  nowtime,u   time display
         bsr   printl   put time on screen
         tst   dire   dir e?
         beq   read   no, get first filename
         leax  subhead,pcr   yes, address of column headings
         bsr   printl   put on screen
************************************
```

Two CCRD cartridges can be plugged into the Color Computer extension interface at the same time to give one megabyte of *RamDisk* storage. Johnson sells an OS-9 device driver named "CCRDV" for use with the CCRD.

Kevin Darling of Darling Software, 3081 Stonybrook Drive, Raleigh, NC 27604, has written a *RamDisk* driver for the DSL 128K memory upgrade board. It's used in the same manner you use Lantz's drivers with the *Thunder RAM*, except there is only 128K of memory, so it can't emulate a 40-track floppy disk.

Another 256K RAM memory upgrade board named the "Banker" is being marketed by Jesse Jackson and Ray Rowe, of J & R Electronics, P. O. Box 2572, Columbia, MD 21045, phone (301) 987-0578. They made a presentation to the Northern Virginia Color Computer Club in Manassas, but I was unable to attend the meeting.

The GIMIX Single Board 68020 Entry

While we're on the subject of new hardware and software, we've got two more items that should perk your interest. First, on the software front, *K-BASIC* from Lloyd I/O has been up-

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dated. It will now compile *TSC BASIC*, *XBASIC* and *XPC* source code files. This means you can run any *TSC XBASIC* software under OS-9. You need only transfer the source code to OS-9, compile it, assemble it and find your favorite FLEX application software running under OS-9.

On the hardware front, speed is again the keyword. Richard Don at GIMIX, 1337 West 37th Place, Chicago, IL 60609, phone (312) 927-5510, has announced the GMX Micro-20 single-board computer. You'll find this board is a powerful, compact 32-bit computing system featuring two megabytes of memory, serial and parallel I/O ports, a floppy disk controller, a SASI interface for intelligent hard disk controllers and a time of day clock with battery backup. If you're really in a hurry, plug in an optional MC68881 floating-point co-processor for number crunching. It can also be used with an optional network interface that supports up to 32 nodes. Frank Hogg at FHL plans to feature a model of his QT computer that uses this board.

GIMIX ran several benchmark programs on their new board and supplied the results. A program named

```
*
* READ AND DISPLAY FILE NAMES
*
read     leax   dentry,u   address for filename
         lda    dpath   directory path number
         ldy    #29   maximum filename length
         os9    i$read   get filename
         bcs    done   branch with error
         leax   mssectr,u   address for descriptor sector number
         ldy    #3   three bytes
         os9    i$read   get desciptor sector number
         bcs    done   branch on error
         lda    dentry,u   first filename character
         anda   #%01111111   clear ms bit
         cmpa   #'A   valid filename?
         blo    read   no, get next name
         clrb    yes, zero character counter
         leax   dentry,u   address of filename
loop     incb    count character
         lda    ,x+   last character?
         bpl    loop   no, get another
         anda   #%01111111   yes, clear ms bit
         sta    -1,x   return to filename
         lda    #$0d   carriage return
         sta    ,x   terminate filename
         tst    dire   dir e?
         bne    doitall   yes, do full directory listing
         clra    no
         tfr    d,y   length of filename
         leax   dentry,u   address of filename
countit  dec    count   column 5?
         beq    endline   yes, print with carriage return
         subb   #16   longer than 15 characters?
         bpl    countit   yes, take another column
```

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```
         bsr    print2   print filename
         leax   space,pcr   address of fill spaces
         clra
         negb    make positive
         tfr    d,y   number of spaces to fill column
         bsr    print2   fill entire column
         bra    read   get next filename
endline  bsr    print1   end of line, print with carriage return
         lda    #5   new column count
         sta    count   save it
         bra    read   get next filename
*********************************
*
* ERROR CHECK AND TERMINATION
*
done     cmpb   #e$eof   end of file?
         bne    out   no, quit with error
         leax   cr,pcr   yes, carriage return
         bsr    print1   print it
         clrb    clear error
out      os9    f$exit   quit
*********************************
*
* SCREEN PRINT SUBROUTINE
*
print1   ldy    #255   maximum line length
print2   lda    #1   standard output path
         os9    i$writln   write to screen
         bcs    out   exit with error
           s    return
*********************************
*
* SET DISPLAY FOR DIR E
*
```

bnchtour, which executed in 42 minutes and 19 seconds on the GMX Micro20 board running at 12.5 MHz, took two hours and 28 minutes to run on a MIZAR 68000 running at 10 MHz and three hours and 39 minutes to run on a QT using the UniQuad 68008 board with an eight MHz clock speed.

Computerware Offers More OS-9 Software

Paul Searby at Computerware, 4403 Manchester Ave., Suite 102, Box 668, Encinitas, CA 92024, phone (619) 436-3512, is another vendor who has made a strong showing in the OS-9 world in the past six months. I received three programs from Paul — a text processor, a new debugger and a Macro assembler. Additionally, he is preparing to issue another OS-9 utility package in the near future. Among other things, it will contain a new Shell that will make your 6809 OS-9 look like 68K OS-9 — wild cards and all.

Computerware's OS-9 *Text Formatter* ranks with the best. If you've used the TSC text processor with the FLEX operating system, you'll be right at home. Also, if you've used the UNIX "nroff" text processor on a minicompu-

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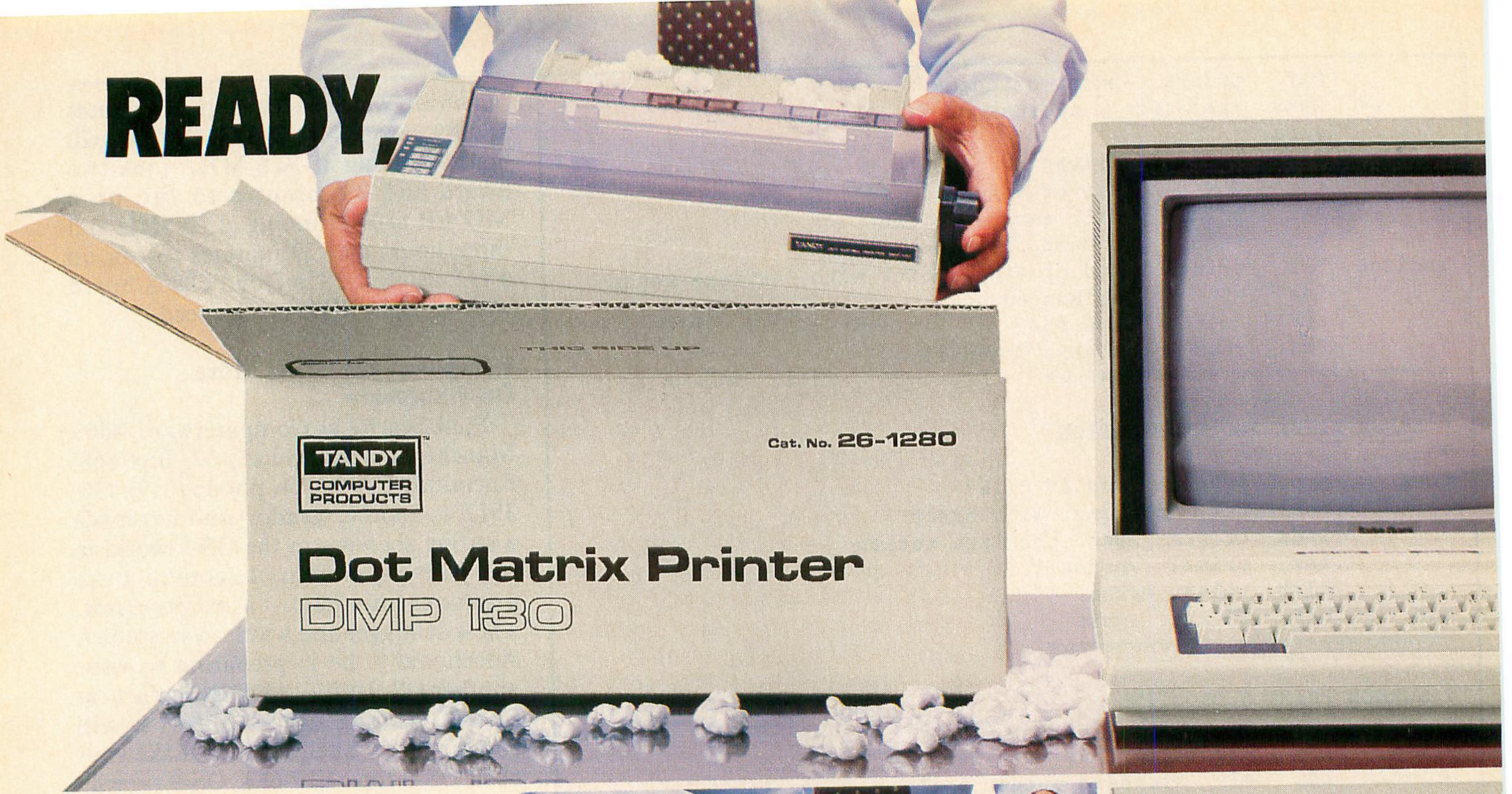
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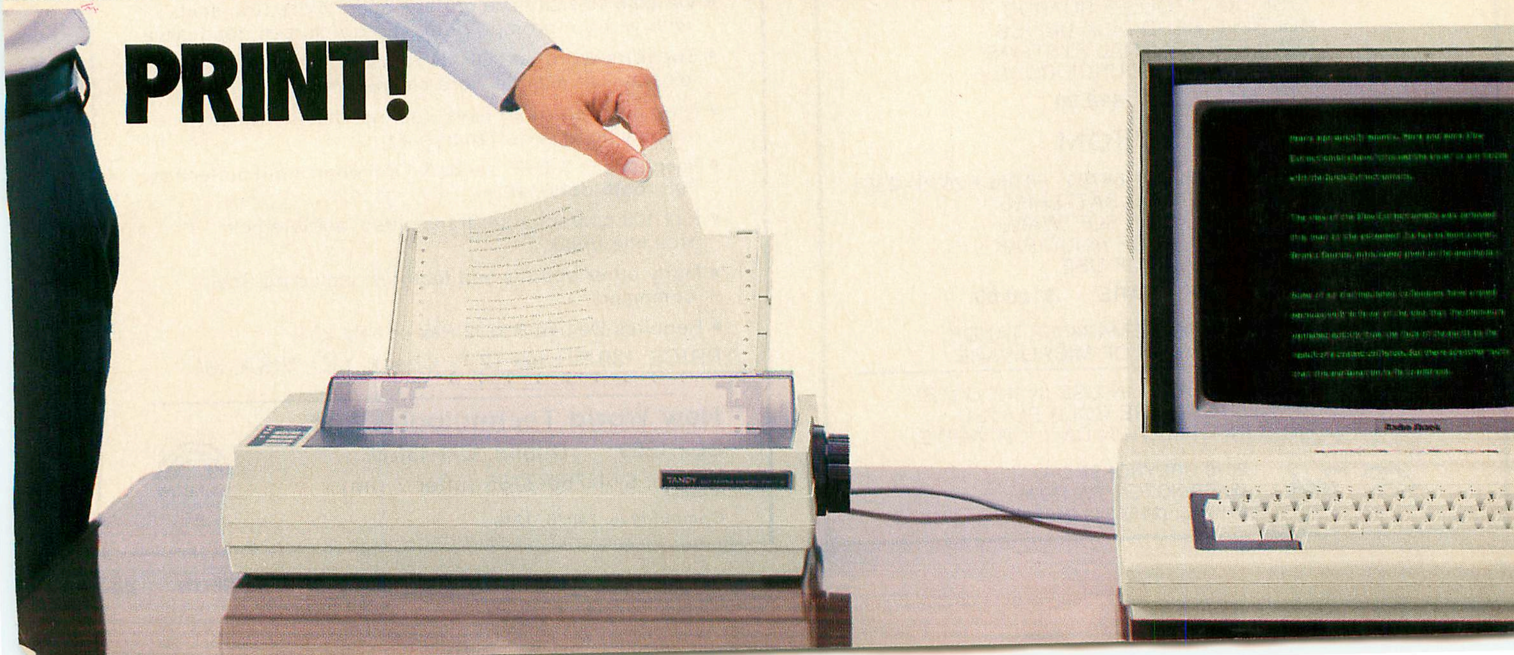
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ter at work you'll be impressed. Computerware has gone out of the way to make the OS-9 *Text Formatter* as compatible as possible with "nroff." By the way, "nroff" stands for "new run off" in UNIX speak.

When working with a text processor, you create your product in two passes. First, you edit the copy with a text editor, then you list the copy through the text formatting program. When typing the copy, you enter special formatting commands in the file by typing a period followed by a two-letter code and optional parameters at the beginning of a line. Later, when listing the copy to the printer via the text formatter, it will read your commands and format your text accordingly. For example, if you have been typing single-spaced copy but want to switch to triple spacing for emphasis, simply type the command `.ms 3` at the very beginning of a line in your copy. All lines following this command will be triple-spaced until the processor reads a single-space, command.

Computerware's *CBug Debugger* is also impressive. Written by Chris Bone, it is a screen oriented debugger that features a built-in disassembler, single step capability, a memory window and access to the OS-9 Shell. *CBug* will run on a standard CoCo 32 character screen, a 51 by 24 Hi-Res screen or an 80 by 24 screen such as those available from PBJ's *Work-Pak II*. Information about the current state of your microprocessor is displayed along the bottom of any of these screens. The rest of the area is used for a memory edit window, and to list breakpoints and disassembled listings.

The *CBug* display of the 6809's condition code register is clever. Seven letters are always displayed — fhinzvc. However, if one of these bits is set, it is displayed as an uppercase character. Otherwise, it will always appear as a lowercase letter.

CBug sets breakpoints and single steps through your program by placing a software interrupt instruction at the address where you want the program to stop. You may disassemble a portion of your code by typing a 'D' followed by the starting address of the code you want to study. Normally, your disassembly will go to the Color Computer screen. However, if you want to send it to a printer or a disk file, type a space followed by a complete pathlist after the address. During the next month we'll try to take a look at Computerware's OS-9 *Macro Assembler*.

```
doitall  leax  form,pcr   address of display line
         leay  display,u   data address for display
formloop lda   ,x+  get character
         beq   sectr   branch if done
         sta   ,y+  not done, save it in data area
         bra   formloop   get next character
**********************************
*
* SECTOR DISPLAY
*
sectr    leax  mssectr,u   ms byte of sector number
         leay  sector,u   address of sector display
         ldb   #3   three bytes
sctrloop lda   ,x+   get byte
         lbsr hex   convert to hex
         decb   done?
         bne   sctrloop   no, get another
         leax  sector,u   yes, start of number display
         bsr   scratch   clear leading zeros
**********************************
*
* GET FILE DESCRIPTOR DATA
*
         ldx   mssectr   most sig. bytes of sector position
         pshs  u   save U register
         ldu   lssectr   least sig. bytes of sector position
         lda   dskpath   disk path number
         os9   i$seek   find file descriptor sector
         bcs   out   exit with error
         puls  u   retrieve U register
         leax  stuff,u   address for file descriptor data
         ldy   #13   13 bytes
         os9   i$read   get descriptor data from disk
         bcs   out   exit with error
**********************************
*
* ATTRIBUTE DISPLAY
*
         leay  attribs,u   attribute display address
         ldd   #$2d08   a="-" for blanking; b=8 counter
attrloop lsl   ,x   attr set?
         bcs   nextattr   yes, check next
         sta   ,y   no, blank it out
nextattr leay  1,y   next attr
         decb   done?
         bne   attrloop   no, get next
**********************************
*
* OWNER NUMBER DISPLAY
*
         lda   who   ls byte of owner number
         leay  owner,u   owner display address
         bsr   dec   binary to decimal
         lda   owner   get first digit
         cmpa  #$20   number?
         beq   fsize   no, continue
         adda  #16   yes, make ASCII
         sta   owner   save it
**********************************
*
* FILE SIZE DISPLAY
*
fsize    leax  sze,u   ms byte file size
         leay  size,u   size display address
         ldb   #4   counter
szloop   lda   ,x+   get byte of size
         bsr   hex   convert to hex
         decb   done?
         bne   szloop   no, get next byte
         leax  size,u   yes
```

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The Sourcerer is a menu driven symbolic 6809 disassembler that produces symbolic source code that can be assembled. It is compatible with most editor/assemblers that produce ASCII files. $39.95

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by Brian Lantz

This set of utilities includes a hi-res screen that is 27% faster and saves more than 3.5K over other drivers. The stand-alone sound utilities, SOUND, VOICE, and SND allow sound through OS-9 independent of extra hardware. TALKER, TALK, and SPEAK are the driver, descriptor, and command needed to use the Radio Shack SSC pak to output speech from the keyboard or from text files. Three special "boot" routines are also included.

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This Month's Listings

This month we feature three handy Shell scripts or procedure files, a BASIC09 program that scrolls pictures on the CoCo screen and a C filter for CompuServe users.

Our first contribution comes from Donald L. McGarry of Northport, N.Y. "Since these were developed shortly after I had read your book, I was interested in using Shell scripts to accomplish any and all tasks for practice," he said. "The result is fully automatic. You wind up with new DIR and MDIR commands plus a renamed copy of the original command. It's a no-lose situation, if something goes wrong, nothing is permanently altered."

After running the procedure file named *wide.dir*, you will have a new copy of DIR in your current execution directory, /D0/CMDS. You will also see another file named *Dir32* in /D0/CMDS. The listing "wide.mdir" works in the same manner.

While on the subject of 80-column displays, here's a short Shell script that modifies the DUMP utility command for 80-column output without the use of the "-L" option. It was contributed by Stephen B. Goldberg of 695 Plainview Road, Bethpage, NY 11714.

Whenever possible, we try to show several different ways to accomplish the same task. This month, Stephen Goldberg contributed an assembly language listing of a new DIR command that prints in 80 columns. He said that if you don't want to take the time to type in this listing, send him a standard Tandy OS-9 formatted disk, a self-addressed, stamped mailer and $3 and he will return it to you with both the source and object code.

Goldberg's DIR uses the same syntax as the original utility and spreads the standard directory over five columns across the full width of the screen. The DIR E display is the same as that shown on Page 23 of the OS-9 commands manual. Goldberg writes, "Since we have only 87 terminals connected to our CoCo (just kidding), I didn't implement calculation of all possible user numbers. Only users between zero and 99 will be reported correctly in the owner column of the display. If you run more than 100 users on your CoCo OS-9 system, you will want to rewrite the owner number routine." Enjoy!

Mark W. Smith contributed some more of his work this month and we're featuring his BASIC09 procedure named *pixscroll*. In order to use *pixscroll*, first copy your Radio Shack pictures to OS-

```
         bsr    scratch   clear leading zeros
         cmpb   szend    size=0?
         bne    date   no, continue
         sta    szend    make it zero
************************************
*
* LAST MODIFIED DATE DISPLAY
*
date     leay   year,u   address of date display
         leax   yr,u   start of date
         bsr    setdate   set the date of modification
         lda    ,x+   get hour
         bsr    dec   make ASCII
         lda    ,x   get minutes
         bsr    dec   make ASCII
************************************
*
* DISPLAY FILE DATA
*
         leax   display,u   start of display line
         lbsr   printl   put line on screen
         lbra   read   get next filename
************************************
*
* DELETE LEADING ZEROS
*
scratch  ldd    #$3020   a="0"; b=$20 (space)
ziploop  cmpa   ,x   check numeral
         bne    home   no, return
         stb    ,x+   yes, make space
         bra    ziploop   try again
************************************
*
* BINARY TO HEXADECIMAL
*
hex      pshs   a   save byte
         lsra    move the
         lsra    most signifcant
         lsra    nibble to the
         lsra    least sig. position
         bsr    hex2   make hex
         puls   a   get byte again
         anda   #%00001111   kill most sig. nibble
hex2     adda   #'0   make ASCII
         cmpa   #'9   greater than 9?
         bls    save   no, save it
         adda   #7   yes, make letter (A-F)
save     sta    ,y+   save hex char.
home     rts    return
************************************
*
* BINARY TO DECIMAL
*
dec      cmpa   #10   less than 10?
         blo    unit   yes, set units
         inc    ,y   add 1 to 10 column
         suba   #10   subtract 10
         bra    dec   look again
unit     leay   1,y   less than 10
         adda   #'0   make ASCII
         sta    ,y+   save it
         rts    return
************************************
*
* DATE DISPLAY
*
setdate  ldb    #3   3 bytes
dtloop   lda    ,x+   get byte
         bsr    dec   make decimal ASCII
         leay   1,y   skip separator
```

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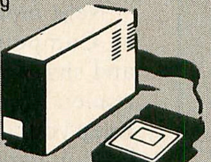

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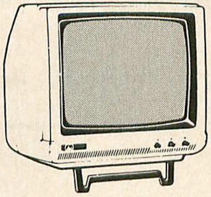

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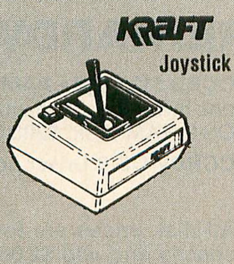

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```
          decb   done?
          bne    dtloop   no, do again
          rts    yes, return
*
*
subhead  fcb    $0a
         fcc    / Owner  Last Modified  Attributes  Sector  Bytecount  Name/
         fcb    $0a
         fcc    /============================================================/
cr       fcb    $0d
form     fcc    "     0   00/00/00 0000   dsewrewr"
space    fcc    /                         /
         fcb    0
dot      fcc    /./
head     fcb    $0a
         fcc    / Directory of /
at       fcc    /@/
timeform fcc    "     00:00:00"
         fdb    $0d00
         emod
len      equ    *
         end

************************************************************************
```

Listing 6:

```
#include <stdio.h>
main()
{
   int c,i,j,last;
  last=32;
  while((c=getchar()) != EOF) {
   i = '\0';
   if( c > 30 )
    if( (c == '('  || c == '*' ) && ( last == '\n'  || last == '\r' ) ) {
       i=getchar();
       if (( c == '(' && i == 'U' ) || (c == '*' && i == ' '))
       {
         while((c=getchar()) != '\n' )
          ;
       }
      else
        {
         putchar(c);
         putchar(i);
        }
    }
    else
      putchar(c);
    if( c==10 || c==13)
        if(last != 10 && last != 13)
          putchar(c);
    last = c;
  }
}

************************************************************************
```

9. Smith uses FHL's *O-PAK XCOPY* tool for the job, but there are now several other utilities that can be used. Thanks Mark, *pixscroll* is fun.

Our last contribution this month comes from John Carter of Smyrna, Ga., who has also shared his work in earlier columns. He writes, "I frequently do a scan of the CoCo and OS-9 SIGs on CompuServe, then read just the messages of interest. I then print and file these messages in a binder. I needed a routine to delete the junk lines from the output. I wrote *cis.c* to do the job."

More C Shortcuts and Notes

Next month, we hope to take a look at Computerware's *Macro Assembler* and share a few C tips from two of our readers, Rick Moore and Albert Pinto. Keep your cards and letters coming and, if you have a short script file or a BASIC09, C or PASCAL program you would like to share with other "KISSable OS-9" readers, please send it in.

We received a note from Greg Morse, of Morse SoftCode, 10871 Roseland Gate, Richmond, British Columbia, Canada V7A 2R1, author of OS-9's first "shareware" program, *XCom9*. He wants us to know that because of a lack of support for the I$GetStt call in the RS-232 driver used with device /T1, you need a deluxe serial pack like the one from PBJ or Radio Shack to run *XCom9* on the Color Computer. He also suggests when ordering the program to specify the CoCo format or you will receive a standard OS-9 format disk.

Enjoy the Shell scripts and programs in this month's column, catch the Microware OS-9 Seminar if you can get to Des Moines and have a happy Thanksgiving holiday. We'll look for you in December.

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LEARNING OS-9

The Utility Room

In this series on writing OS-9 utilities, the author begins with some simple explanations of assembly language programming under OS-9

By Brian A. Lantz

Ever since primitive times, people have been taking a good idea and trying to make it different (not always, or necessarily, better!). Well, we may be in a highly civilized, computerized age, but we have not outgrown this urge to change the things we feel can be made better.

You know the scenario — you've just gotten the "program to end all programs." You open the package, read the 1,000 pages of documentation, load it and know (at a glance) how *you* could have made it better!

Perhaps you are one who just sits in front of the computer and marvels at that "great creation," totally in awe as to how anyone could do such a thing.

No, this isn't a philosophy lecture. It is simply to point out that we all have one thing in common, whether we are an advanced "hacker" or a beginner: We all would like to learn how to improve our programming skills, and *perfect* the programs we use from day to day.

From One Student to Another

Since many of my OS-9 utilities are being distributed by Computerware and Frank Hogg Laboratories, I have been asked to share some of my knowledge (though be it limited) on assembly language programming in OS-9. My first goal is to make it simple enough to aid someone learning assembly language. My second goal is to accomplish the first goal and, at the same time, not insult your intelligence.

This article also serves to instruct the experienced assembly language programmer who is new to the OS-9 programming environment. OS-9 takes care of a lot of the mundane chores (I/O, interrupt handling, etc.), but has a very strict set of rules that need to be observed. The examples I present in the next few articles should get your feet wet and give you some ideas of your own.

We will examine some OS-9 utilities you should be familiar with, rewrite them and add features that would have been there in the first place (had *we* been the programmers). In later articles, after we have converted a few utilities, we will write some utilities from scratch. Here's where you can help. Send in some ideas for utilities that you'd like to see developed and we'll give them a try.

Working on the Assembly Line

Why assembly language? Why not C or BASIC09? Rather than cause a debate, let me emphasize that there are advantages and disadvantages to any language, even assembly language.

The advantages of 6809 assembly language include optimum speed, easy transportability to other 68XX computers and, most importantly, size. A program done in assembly language is usually several times smaller than a comparable program in C, for instance. Though this may not be important if you are on a Level II OS-9 system, it is a major factor on a Level I OS-9 computer, such as the CoCo. The smaller program is also better if you have limited disk space.

Later columns will introduce the C programming language and how it can effectively be used for utilities. BASIC09 will also be explored in the future.

(Brian A. Lantz lives in Tampa, Fla., and is president of the National OS-9 Users Group. He is a free-lance programmer, with programs carried by Tandy, Computerware and Frank Hogg Labs. He has developed much of the commercial OS-9 software released in the last year.)

Making Our List

As a starting point, let's look at the LIST command. Listing 1 contains essentially the same LIST command as in the OS-9 Technical Information manual. This listing has been slightly rewritten, with more complete comments. Thanks to Microware Systems Corporation for their permission to use this listing as the base point from which we will work. The line numbers are included to give reference points within the article. When you enter this, do *not* enter the line numbers.

I'm not going to attempt to explain each instruction in this utility, but I will briefly explain some of the areas of Listing 1 that are unique to OS-9 programming.

If you are new to assembly language, I recommend buying a good reference book on assembly language programming for the 6809. There are several good ones available: *6809 Assembly Language Programming* by Lance A. Leventhal, *Programming the 6809* by Rodney Zaks, *6809 Microcomputer Programming & Interfacing* by Andrew C. Staugaard, Jr., *The MC6809 Cookbook* by Carl D. Warren and *TRS-80 Color Computer Assembly Language Programming* by William Barden, Jr. All of these (except the last one, which is a Radio Shack product) are available through your local bookstore.

The listing:

```
10             * Original LIST Utility command
20             *
30             NAM LIST
40             IFP1
50             USE /D0/DEFS/OS9DEFS
60             ENDC
70   TYPE      SET       PRGRM+OBJCT
80   REVS      SET       REENT+1
90             MOD       THEEND,LSTNAM,TYPE,REVS,BEGIN,LSTMEM
100  LSTNAM    FCS       "List"
110            *
120  BUFSIZ    EQU       200
130            ORG       0
140            * this is the beginning of the data area.
150  IPATH     RMB       1         this is the input path #
160  PRMPTR    RMB       2         this is the parameter pointer
170  BUFFER    RMB       BUFSIZ    this is the input buffer
180            RMB       200       this is the stack's memory
190            RMB       200       the parameter area is here
200  LSTMEM    EQU                 this ends the data area
210            *
220            * The following line sets the EDITION number to 4
230  VRSION    FCB       4
240            *
250  BEGIN     STX       PRMPTR    save your parameter position
260            LDA       #READ.    set access mode for reading
270            OS9       I$OPEN    attempt to open file
280            BCS       EXIT      if an error, end program
290            STA       IPATH     store input path #
300            STX       PRMPTR    store parameter position
305            * this is the main loop
310  MAIN      LDA       IPATH     get input path #
320            LEAX      BUFFER,U  set 'X' point to the buffer
330            LDY       #BUFSIZ   set 'Y' to maximum # of bytes
340            OS9       I$READLN  attempt to read a line
350            BCS       EOFCHK    branch out if error or EOF
360            LDA       #1        load 'A' with standard output
370            OS9       I$WRITLN  write to standard output
380            BCC       MAIN      if no error, loop back
390            BRA       EXIT      otherwise, end program
395            * check for End Of File
400  EOFCHK    CMPB      #E$EOF    is it the EOF ??
410            BNE       EXIT      if not, error has occurred
420  EOF       LDA       IPATH     get input path #
430            OS9       I$CLOSE   and close the path
440            BCS       EXIT      if an error, branch
450            LDX       PRMPTR    get position in parameters
460            LDA       0,X       check next character
470            CMPA      #$0D      is it a <CR> ??
480            BNE       BEGIN     if not, LIST another file
490  OUT       CLRB                clear 'B' and 'CC'
500  EXIT      OS9       F$EXIT    exit the command
510            EMOD                set module's CRC
520  THEEND    EQU       *         end of program
530            END                 tell ASM that you're through!
```

OK, grab your reference book in one hand, this magazine in the other.

Checking it Twice

Lines 40 to 60 allow the assembler to include ("use") the OS-9 DEFinitions file during the first pass of the assembler (IFP1).

In order for a program to load and execute under OS-9, it must contain certain information in a "header":

1) Size of program
2) Name of program
3) Location of the program's name
4) Type of program
5) Size of data area needed
6) Where to begin the program

Along with this, the header must contain a parity-checking byte. At the end of the program, there must be three bytes that equal the CRC value of the program.

Wait! I know that sounds like a lot, but Microware made it fairly easy. The MOD and EMOD directives are used to give the program this needed module information. MOD sets up the module's (program's) header. All you need to do is give it some information and it does the rest. In Line 90, you see the following.

```
MOD  THEEND,LSTNAM,TYPE,
REVS,BEGIN,LSTMEM
```

This gives the assembler, respectively, the length of the program, the location where the name can be found, the type of program module it is, the revision of the program and its attributes, the entry point of the program and the size of the data memory the program needs. One line does it all!

I know some of this is a bit abstract, but as we progress, you will understand it fully. For now, take it in faith and jot down your questions.

The EMOD instruction is even easier. Look at Line 510. EMOD tells the assembler to place the CRC value of the program module at the EMOD instruction location. This CRC value is calculated automatically while the assembler is "doing its thing"; EMOD just tells the assembler where to place this information. Again, you don't need to understand this to use it!

The FCS directive is also unique to OS-9. It is like the FCC (Form Constant Characters) directive, except the most significant byte of the last character is set when you use FCS.

Lines 150 to 200 define the data memory area for the LIST command. When this program is started, Register Y is at LSTMEM, or the end of the allocated data memory. Register U is at the other end of the data memory, IPATH. Register X is somewhere within the range of memory allocated by Line 190. Its location is variable, based on how many parameters are passed to the LIST command on the command line. The stack pointer is sitting "on top" of Register X and, as it grows, moves toward Register U (this is why Line 180 exists, to allow it room to grow). Register D (Registers A and B) is equal to the total amount of characters in the parameter area.

All utility commands have their registers set up in this way by OS-9. (For other information about the initialization of the registers and entry conditions, see the description in the Technical manual of the FORK and CHAIN system calls, pages 82-83 and 95-97 in the CoCo version.)

Note the use of the RMB (Reserve Memory Bytes) instruction in the data area. You can reserve memory in the data area, but you cannot specify what these memory locations will contain. If you need to initialize these variables, then it must be done at the beginning of the program.

Line 230 contains the version number of the command. The version number (edition number of the IDENT utility command) will always be the first byte of the program, which precedes the program name.

As mentioned, Register X contains the address of the parameter list passed to the command from the command line. This address is stored at PRMPTR at the beginning of the command so it can be used later. Lines 260 and 270 open a file, whose name is located at the address pointed to by Register X, and stores that path number at IPATH. When you open or create any I/O path, a path number is returned in Register A.

Lines 310 to 350 read in a line from the file. To read or write to an I/O path, you must tell OS-9 three things. First, the path number, in Register A (Line 310). Second, the address of a buffer large enough to hold the information, in Register X (Line 320). And third, the maximum number of bytes to be read/written, in Register Y (Line 330).

Line 360 loads 'A' with the path number for the standard output path (path #1), then the information is written (lines 370 and 380). After this, the program loops back to MAIN.

This loop is interrupted on Line 350 when the End Of File (EOF) is reached. When this happens, the program is sent to Line 400. At this point, the error number from the READLN (in Register B) is compared to the EOF error code. If it is another error, the program exits with the error.

If the EOF is reached, the I/O path is closed (lines 420 to 440). Now we get back our place in the parameter list (from PRMPTR). We check the next character (0,X) and compare it to a Carriage Return (CR). If the next character is a CR, then we have reached the end of the parameter list and we end the command. If the end of the line has not yet been reached, we loop back to the BEGINning.

Naughty and Nice

If *you* had programmed this utility, what would you have added?

Would you have made it able to accept data from the standard input, as well as from files? Good idea! Presently, if the LIST command is used on the standard input you'll get an error message.

Would you make it possible to print a small range of lines, rather than

"Why assembly language? . . . let me emphasize that there are advantages and disadvantages to any language, even assembly language."

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having to print out the whole file each time? I knew you would think of that! That makes it more like BASIC's `LIST` command and FLEX's LIST utility command.

It would have been nice to include a way to optionally print line numbers at the beginning of a line — a nice touch!

And, you would like error messages that told *why* the error occurred. If you are like me, you're tired of the cryptic "Error #747"!

Well, there's good news and bad news. The good news is all of these modifications can be easily made. The bad news is that in this month's column, we will only have room to add the first feature to LIST — that of receiving input from the standard input. Next month, we will provide LIST with the way to print only a certain range of lines.

The syntax for the LIST command requires a filename. If a pathname is not included, an error is produced. But, by allowing us to receive our input from the standard input, we make the pathname in the command's syntax optional and allow LIST to be used within a pipeline. Now, how do we do that?

From lines 290 and 310 of the listing, the input path (IPATH) is what determines where the command looks for its input. When the command is started, IPATH contains an unknown value. We know the standard input path is path #0, so let's add line number 255, which will set up a default path number of zero. It looks like this:

```
CLR IPATH
```

This clears the data memory location named IPATH, that is, it sets its value to equal zero.

Now, we need the program to be able to "sense" whether or not there is a pathname given to it. The place to put this routine is before Line 260, since this line starts the routine to open the file. We know where to put it, but how do we test for a filename?

One easy way is to test the character that Register X is pointing to and compare it to a CR, just as the command does in lines 460 to 480. If the character at 'X' is a CR, there are no other parameters in the command line, hence, no pathnames. Add these lines between lines 255 and 260:

```
LDA 0,X      get character at 'X' and
             place in 'A'
CMPA #$0D    is the character a CR?
BEQ MAIN     if so, skip to MAIN
```

The last line makes the command skip the routine that opens a file. Since we cleared IPATH in Line 255, when we get to MAIN and load 'A' with IPATH, we will be setting it up to read from the standard input. (And you thought this would be difficult!)

When we get to Line 450, the program already knows not to open "another" file, since the parameter pointer (PRMPTR) will be pointing to a CR. Four lines is all we need to add to the command to allow input from the standard input or now, optional pathnames.

We did not do a lot of programming this time; instead, I did a lot of explaining. Next time, I will show how to alter the LIST command to allow it to print only a given range of lines. In the future articles, we will examine how to handle more complex error messages and automatic line numbering.

Go Ahead, Let Me Have It

I need your feedback on other command changes you'd like to see explained or utilities you'd like to see written. Do you have an assembly problem you can't solve? Send it in! ☐

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ACCESSIBLE APPLICATIONS

A Mailing Label Printer For The Spreadsheet

By Richard A. White
Rainbow Contributing Editor

Last month we discussed using a spreadsheet as a file manager and presented the concept of using a BASIC program for special printing chores that are impossible from the spreadsheet itself. I did the program to print mailing labels and wonder of wonders, it works.

The idea of writing programs for special manipulation of data files is as old as computers. In recent years, specialized software for many of these tasks has reduced the amount of customizing the user needs to do. Still, if you are going to try to stay with generalized utility programs, you need to do some programming. It may be done using a language provided by the utility itself, as in *Elite*File* or *Vip File*. If you know the structure of the database, the programming can be done in BASIC or any other language.

Most CoCo spreadsheets can produce an ASCII disk or sometimes tape file, a file of known structure. When choosing the output function in *Dyna-Calc* with /O, you are asked for a filename, then a stream of number codes for the letters (just like those that might go to a printer) are sent to a file on disk or tape.

To understand how the file might be structured, we need to look at how the data is structured in the spreadsheet. Since we are going to set up the mailing list in a spreadsheet, we can establish the structure pretty much as we need to do the job. The specifications include the number of fields to use, what goes into each field and how wide the column for each field should be. Here is a setup that works well for me.

Column	Contents	Width Characters
A	ACCOUNT #	25
B	FIRST NAME	16
C	LAST NAME	16
D	ADDRESS 1	25
E	ADDRESS 2	25
F	CITY, STATE	20
G	ZIP CODE	10
H	TELEPHONE	12

The account number can include a variety of information and it may or may not be printed on the label. A membership or subscription expiration date is a natural use, but you could also code sales activity or other needed data into the field. First and last names are in separate fields to make possible sorting on the last name within the spreadsheet.

Two address lines allow entry of a company name or suite, apartment or box numbers along with a street address. City and state are grouped in one field since mailing sorts are done on ZIP codes rather than city or state. ZIP codes are set up so that state and city automatically group on a ZIP code sort. Note the 10-character ZIP code field, which supports the new nine-digit-plus-dash ZIP codes. The 12-character telephone field accepts long-distance numbers.

In making the spreadsheet, the column widths are set as shown in the table. Data is typed into each column as you work across the spreadsheet; you move down one row for each new name. When you print the spreadsheet, it will print pretty much as you see it, but if your printer supports only 80 characters per line, the lines will wrap around and mess things up. Even if condensed type is used on an 8½-inch wide printer, you can only print 132 characters per line and wrap around still occurs because

---

(Richard White has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the author of the TIMS *database management program.)*

the spreadsheet sends the full 149-character line when your range includes the full eight fields.

Printing mailing labels is somewhat different, since to print a label we need to find a name and print it on one line, find an associated address and print it on the next line and so on.

When making an ASCII file from a spreadsheet, make the range wide enough to include all eight fields and as many records as you want to print. The spreadsheet saves each row or record at a time with a carriage return after each. BASIC loads each of these records as a whole into the string variable. The empty parts of each field are filled with spaces, so the record loaded by BASIC is the full 149-characters long.

Figure 1 diagrams the record with periods substituted in the spaces for clarity. For example, the FIRST NAME field starts at byte 26 of the record and goes to byte 41. Each field in the record occupies a specific portion of the record just as it did in the spreadsheet. Knowing just where each field starts and stops lets us write BASIC statements that return a particular field from the record. We do some calculations and know exactly at what character in the string each field begins, or better still, let BASIC do the calculating.

> ***"The idea of fields starting at a specific byte of a record and using the next certain specified number of bytes is central to most computerized data handling."***

The idea of fields starting at a specific byte of a record and using the next certain specified number of bytes is central to most computerized data handling. For the most part, BASIC manages variables so the need to specify field and record sizes is not required, and programmers can deal many times with variables of variable length. Only when a direct access file is used does the programmer need to size fields and records. Since all spreadsheets and most file managers work with fixed length fields, any program that deals with output from one of these utilities will need to deal with fixed length fields.

The program in Listing 1 prints one-across, one-inch high labels on continuous label stock. It sends its output to a printer, or to a file for later use, perhaps with a mail-merge program to print personalized form letters.

First, the program goes to Line 10100 to `PCLEAR 1`, clears 5,000 bytes of string space, then jumps to Line 2000 to check on tape or disk and set printer Baud rate in Line 2005. I run at 9600 Baud to a serial/parallel interface, so I have `POKE 150,1` in the program. Change that as necessary to fit your printer.

In Line 100, field size data is read into the CR(X) array. First, the program reads A$ and then CR(X) in a `FOR . . . TO . . . NEXT` loop. The data in A$ is essentially thrown away. We can see why by looking at Line 2020.

```
2020 DATA ACCOUNT#,25,1ST NAME,16,LAST NAME,16,
     ADDRESS1,25,ADDRESS2,25,CITY/ST,20,ZIP,10,
     TELEPHONE,12
```

Note the data pairs, for example, ACCOUNT#,25. This documents a field name and its associated field width. Should you decide you need 35 characters in the account field, set up the spreadsheet accordingly, then change the 25 to 35 in Line 1000 and the program will properly print your labels.

Lines 105 to 140 ask for information on files to be used and open these. Where there is a choice, like pRINTER, tAPE or dISK, press the letter corresponding to the output desired. The output to a tape or disk file might be fed into a word processor to generate a roster. Better still, you might write another BASIC program to produce the roster in exactly the format you need directly to the printer. It does not matter if you are set for uppercase or not, since the `INKEY$` subroutine in Line 1, which gets your response, changes any lowercase character to uppercase.

Lines 150 and 155 find out if you want the account number or telephone number printed. Because only six lines fit on a one-inch label and we should have a blank line between name blocks, either the account or the telephone numbers can be printed, but not both. The account information is printed above the address data, while the telephone number prints below.

In Line 160, an end-of-file test, EOF (1), is made on the input file. In 165, we get a record and test it to see if it contains a full record. If LEN(A$)<2, the record is defective in some way and an error will occur when the program tries to use the record. Unless you make a range mistake in saving your ASCII file, all spreadsheet-produced records should be right. The same cannot be said for files produced in other ways.

From Line 170, the program takes the record apart and prints the label. Line 170 prints the ACCOUNT # if requested.

In Line 175, the variable WS$, for working string, is used here in conjunction with subroutine 20. Data is drawn from the record and put into WS$. Remember how we put first and last names into different fields? Now we must combine the contents of the two fields, but first, any spaces tacked onto the end of the first name to fill out the field must be stripped off. Subroutine 20 does that.

This subroutine keeps looping and dropping one right space from WS$ as

Figure 1: Diagram of the record (with periods substituted for spaces for clarity).

```
ACCOUNT #................FIRST NAME......LAST NAME
1        1         2         3         4         5
         0         0         0         0         0

.......ADDRESS 1................ADDRESS 2.........
5        6         7         8         9         1
1        0         0         0         0         0
                                                 0

.......CITY, STATE.........ZIP CODE..TELEPHONE...
1        1         1         1         1        1
0        1         2         3         4        4
1        0         0         0         0        9
```

long as the right character remains a space. If the field is empty, that is, contains only spaces, Line 20 will find that and return with L=0. We will use this later.

In Line 180, a separating space and the last name are added to the string and the line is printed.

Lines 185-200 deal with ADDRESS 1 and ADDRESS 2 fields. Subroutine 20 determines if a field is empty. If so, it is not printed, but the variable EX is incremented and used to print compensating blank lines at the bottom of the label. Line 205 concatenates the city and state field with the ZIP code field, has them printed on one line and causes the telephone number to be printed if that option is chosen.

The program is fairly short. Its logic is possibly more challenging than the BASIC involved for those with some experience in programming.

This approach gives you another tool for tailoring spreadsheet printouts. A prime tool has always been to use a word processor or text editor on a spreadsheet ASCII output file. This is particularly good if the output file is close to what you want the final report to look like. However, converting a spreadsheet listing to label format in a text editor is too much hard work, but it's the type of work computers are meant to do. □

```
125 ......163
180 .......88
END .....250
```

The listing: MAILLABL

```
0 GOTO10100
1 I$=INKEY$:IFI$=""THEN1ELSE:IFA
SC(I$)>96THENI$=CHR$(ASCI(I$)-32
:RETURN ELSE RETURN
20 L=LEN(WS$):IFRIGHT$(WS$,1)="
"THENIFL-1=0THENL=0:RETURNELSE W
S$=LEFT$(WS$,L-1):GOTO20ELSERETU
RN
100 CLS:FORX=1TO8:READA$:READCR(
X):NEXT:PRINTTAB(5)"RAINBOW LABE
L PRINTER",TAB(6)"BY RICHARD A.
WHITE"
105 PRINT@130,"SEND FILE TO:",,,
"  pRINTER",,,,"  tAPE",,,,
110 IFDK=1THENPRINT"  dISK",,,,:
GOSUB1:IFI$="P"THENDO=-2:DO$=" P
RINTER ":ELSEIFI$="T"THENDO=-1:D
O$=" TAPE ":ELSEIFI$="D"THENDO=1
:DO$=" DISK "ELSE100
115 PRINT@130,"GET FILE FROM:",,
,"  tAPE",,,,
120 IFDK=1THENPRINT"   dISK",,,,
:PRINTSTRING$(128,32):GOSUB1:IFI
$="T"THENDI=-1:DI$=" TAPE "ELSEI
FI$="D"THENDI=1:DI$=" DISK "ELSE
115
125 PRINT@128,STRING$(250,32):PR
INT@130,"ENTER INPUT"DI$"FILENAM
E",,,:PRINT"  ";:LINEINPUTFI$:IF
DI=-1ANDLEN(FI$)>8THEN125ELSEIFD
I=1ANDLEN(FI$)>12THEN125
130 PRINT:PRINT"  OPENING"DI$"FI
LE "FI$:OPEN"I",#DI,FI$:IFDO=-2T
HEN150
135 PRINT@128,STRING$(250,32):PR
INT@130,"ENTER OUTPUT"DO$"FILENA
ME",,,:LINEINPUTFI$:IFDO=-1ANDLE
N(FI$)>8THEN125ELSEIFDO=1ANDLEN(
FI$)>12THEN135
140 PRINT:PRINT"  OPENING"DO$"FI
LE "FI$:OPEN"I",#DO,FI$
150 PRINT@130,STRING$(250,32):PR
INT@130,"PRINT ACCOUNT FIELD Y/A
NY?":GOSUB1:IFI$="Y"THEN AC=1:PR
INT"  PRINTING ACCOUNT FIELD.",,
,:ELSEAC=0
155 IFAC<1THENPRINT:PRINT"  PRIN
T TELEPHONE Y/ANY?":GOSUB1:IFI$=
"Y"THENTL=1:PRINT"  PRINTING TEL
EPHONE"ELSETL=0
160 IFEOF(DI)THENCLOSE:PRINT:PRI
NT"  COMPLETE":SOUND 100,100:END
165 LINEINPUT#DI,A$:IFLEN(A$)<2
THEN165
167 IFAC=0ANDTL=0THENPRINT#DO,"
"
170 PRINT#DO," ":CT=CR(1)+1:IFAC
=1THENPRINT#DO,LEFT$(A$,CR(1))
175 WS$=MID$(A$,CT,CR(2)):GOSUB2
0:CT=CT+CR(2)
180 PRINT#DO,WS$+" "+MID$(A$,CT,
CR(3)):CT=CT+CR(3)
185 WS$=MID$(A$,CT,CR(4)):GOSUB2
0:CT=CT+CR(4)
190 IFL>0 THEN PRINT#DO,WS$ELSEE
X=EX+1
195 WS$=MID$(A$,CT,CR(5)):GOSUB2
0:CT=CT+CR(5)
200 IFL>0 THENPRINT#DO,WS$ELSEEX
=EX+1
205 PRINT#-2,MID$(A$,CT,CR(6)+CR
(7)):CT=CR(6)+CR(7):IFTL=1THENPR
INT#DO,MID$(A$,CT,CR(8))
210 IFEX>0THENPRINT#DO," ":EX=EX
-1:GOTO210
220 GOTO160
2000 DK=PEEK(&H15F):IFDK=196ORDK
=197 THENDK=1ELSEDK=-1
2005 POKE150,1:REM PRINTER BAUD
RATE POKE. SET FOR YOUR PRINTER.
2010 GOTO100
2020 DATA ACCOUNT#,25,1ST NAME,1
6,LAST NAME,16,ADDRESS1,25,ADDRE
SS2,25,CITY/ST,20,ZIP,10,TELEPHO
NE,12
10100 PCLEAR1:CLEAR5000:GOTO2000
```

CUSTOM COLOR

The Letter Box Printer Buffer Part 2

By Dennis Kitsz
Rainbow Contributing Editor

Some say I take too long, talking mumbo-jumbo theory; let's build the project! Nevertheless, the construction of The Letter Box printer buffer must come later. Understanding how this reasonably elaborate electronic device works is crucial to getting it to work at all.

As computer hardware becomes more commonplace, terms such as DRAM (Dynamic Random-Access Memory), access time and bus architecture are often heard. However, these concepts are no better understood now than they were several years ago. The concepts are simple and basic, even tedious — they are like the staff, clefs, noteheads, stems, beams, barlines and accidentals of music notation. There is an important difference between vaguely recognizing them and being able to use them.

This month, I will explain the straightforward task of hooking The Letter Box microprocessing unit (MPU) to a bank of memory. In simplest block-graphic terms, the hookup is shown in Figure 1.

(Dennis Bathory Kitsz is a composer, software author and an electronic designer. His computer career began in 1977 after paying his dues as a librarian, truck driver and graphics designer.)

Building Blocks

This simplistic view can be expanded. Quick Review #1:

- Memory is made up of individual storage cells. Each cell is capable of holding a single binary digit (bit) of information. This information is *data*. Data moves between microprocessor and memory via the *data bus*, a wire pathway.

> ***"Microprocessors speak in 'words' of data, from four bits to 32 bits. An eight-bit word is a byte."***

- Each memory cell is electronically numbered so its data can be located. This number is the *address*. The microprocessor provides the address to the memory via the *address bus*, another wire pathway.

Figure 2 is a more accurate depiction. There are two enhancements in this figure. First, the data path is shown with a double-headed arrow — flowing both to and from the microprocessor: the data bus is *bidirectional*. How do you know which way data moves? The data's address is provided only by the microprocessor, so the arrow for the address path points in one direction.

The second enhancement shows the data and address buses not as single lines, but as wide arrows; this indicates the buses consist of several connections, not just one wire. (Question: How many connections are there?)

The MPU used in The Letter Box is the 6803, described as an eight-bit microprocessor that can address 64K of memory. That brings up Quick Review #2:

- Microprocessors speak in "words" of data, from four bits to 32 bits. An eight-bit word is a *byte*.
- In scientific terms, 'K' is 1,000. In computer terms, 'K' is 1,024 (2 to the 10th power).
- When a microprocessor wants to receive information from memory, the process is called *reading* or *a read*. When an MPU wants to store information, the process is called *writing* or *a write*.

Use that additional information with Figure 3 to get a refined view of the hookup between the 6803 microprocessor and memory. You can see the data bus shown as eight bits (a byte) and the address bus shown as 16 bits. In addition, the MPU is described as an "eight-bit MPU, 64K address space."

The memory is identified as "64K x 8." "64K" is 64 computer K's for a total of 65536 memory locations, and "x 8" (read this "by eight") means each memory location must be the size of the MPU's data word (one byte). The total number of bits is 524,288, organized as 64K x 8.

Finally, an additional connection is shown; it is identified "R/W" (read/write). This connection informs the memory that the MPU wants to read (receive) or write (store) information at a given address.

What do you know so far about the operation? Two things: You know that to read (receive) a byte of data the MPU sends its address on the address bus, followed by a read signal; data from that address flows on the data bus from the memory into the MPU. You also know that to write (store) a byte of data the MPU sends the storage address on the address bus and the data on the data bus, followed by a write signal; data flows from the MPU into memory at that address.

Figure 1 An unrevealing way of showing a microprocessing unit (MPU) joined to memory.

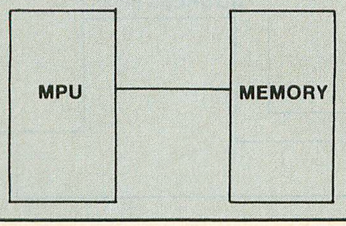


Figure 2 MPU and memory exchange data; the MPU always controls the address information.

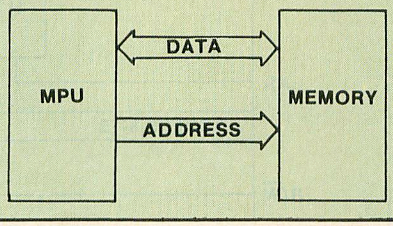

DATA
MPU
MEMORY
ADDRESS

Figure 3 Detailed look describes MPU and memory sizes, and shows width of data and address buses. Read/write (R/W' line is also shown in place.

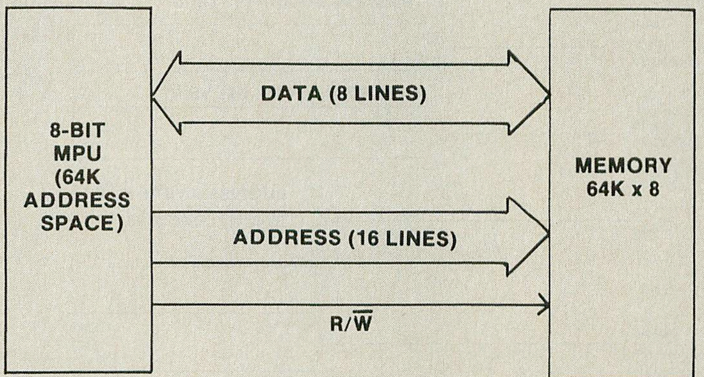
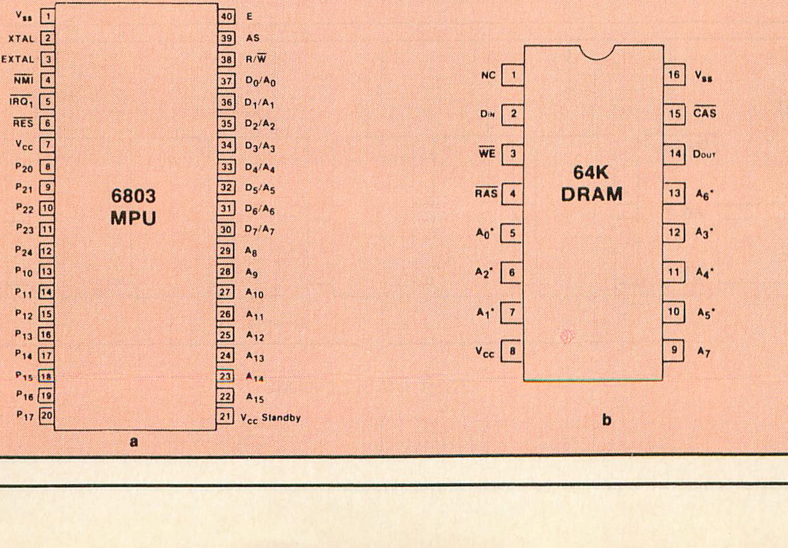

DATA (8 LINES)
8-BIT MPU (64K ADDRESS SPACE)
MEMORY 64K x 8
ADDRESS (16 LINES)
R/W̄

Figure 4 Pinouts of (a) the 6803 MPU and (b) a 64K DRAM. Note multiplexed data/address bus of the 6803 MPU.


Vss 1
XTAL 2
EXTAL 3
NMI 4
IRQ1 5
RES 6
Vcc 7
P20 8
P21 9
P22 10
P23 11
P24 12
P10 13
P11 14
P12 15
P13 16
P14 17
P15 18
P16 19
P17 20
6803 MPU
40 E
39 AS
38 R/W
37 D0/A0
36 D1/A1
35 D2/A2
34 D3/A3
33 D4/A4
32 D5/A5
31 D6/A6
30 D7/A7
29 A8
28 A9
27 A10
26 A11
25 A12
24 A13
23 A14
22 A15
21 Vcc Standby
a
NC 1
DIN 2
WE 3
RAS 4
A0* 5
A2* 6
A1* 7
Vcc 8
64K DRAM
16 Vss
15 CAS
14 DOUT
13 A6*
12 A3*
11 A4*
10 A5*
9 A7
b

Knowing all this, are you now ready to wire MPU and memory together? Before answering, look at Figure 4, which shows some of the connection points (pins) of the 6803 MPU and of a 64K DRAM.

Trouble, right? The MPU has the data bus on the same pins as half the address bus (pins 30-37). And the DRAM has only half an address bus, just one data-in and one data-out pin, plus some mysterious connections labeled CAS and RAS.

The data bus shares pin connections with the address bus in order to make room for other functions on the 6803's 40-pin plastic housing. This is called a *multiplexed bus*. Separating the data from the address isn't hard; timing is everything.

According to the 6803 specification for these pins, the address appears first, followed by the data. Look at Pin 39. Before the address bus changes to a data bus, Pin 39 travels from high (logic one) to low (logic zero). Pin 39 is labeled AS (Address Strobe) and its purpose is to control an external component that can grab the address and hold it steady after the address bus changes to a data bus.

The component is called a *latch*; the process is known as *demultiplexing*. Figure 5 sketches how it fits into the overall picture presented so far.

Figure 6 is a graph of the address demultiplexing sequence. First, the MPU places a valid address on the bus, pins 22-37 (Figures 6a and 6b). Notice that, by tradition, this graph shows the bus going high (logic one) and low (logic zero); since there are 16 address lines that could each be going high or low, both directions are conventionally drawn.

Shortly after the address has become valid (stable enough to use), address strobe AS goes from high to low (Figure 6c), permitting addresses 0-7 to be locked into an external latch (Figure 6d). After that latching process is complete, pins 30-37 become a data bus (Figure 6a).

The hookup process is about to jump one level of complexity, so look again at the memory device shown in Figure 4. This is a 64K DRAM, yet it only contains addresses 0-7 and a single data-in/data-out pair. Why?

The second question's answer first. This is a 64K x 1 DRAM — one bit wide by 65,536 bits long; in effect, it is one-eighth of a byte. Therefore, you need eight of these memory devices for the full 64K x 8 system required by the 6803 MPU. With this knowledge, you can refine the picture a little more: Look at the result in Figure 7.

Everything is still there, but with some changes. There is the demultiplexed address/data bus and the read/write line, but now there are also eight memory devices. The data line for each memory has to be hooked into a data-in/data-out pair, and the 16 address lines have to be funneled into those eight address connections on the memories.

The memory diagram only shows address "A0"-"A7," but there really must be 16 address lines for this to be a 64K memory. A0 through A7, then, are simply convenience names for these pins, which are actually shared address connections. A0 is in reality A0/A8, A1 is A1/A9, and so on, up to A7, which is A7/A15. Like the 6803 MPU itself, the dynamic memory also has multiplexed connections! The "funneling down" process is called *multiplexing*.

Recall demultiplexing the address and data lines from the 6803. A special signal — the address strobe AS — was used to identify and latch the address before the data appeared. Now turn to the DRAM diagram (Figure 4).

Here, too, there must be signals that identify and latch information, and there are. Pin 4 is marked RAS and Pin 15 is marked CAS. RAS means "Row Address Strobe," a signal that tells the memory: "The information now present on the address bus is the low half, A0-A7. Take it." CAS means "Column Address Strobe," informing the memory: "The information now present on the address bus is the high half, A8-A15. Take it."

The challenge to the designer of a computer using DRAM is to provide the RAS and CAS signals to the memory and to multiplex the 16-line address bus into two halves, offered sequentially to the memory in synchronization with RAS and CAS.

I'll begin with the multiplexing. Figure 8 shows an ideal multiplexer. A complete 16-bit address bus goes into the left side and multiplexed bus comes

Figure 5 Address strobe AS is required to latch low order eight bits of data from the 6803 MPU; the full address bus reaches the memory.

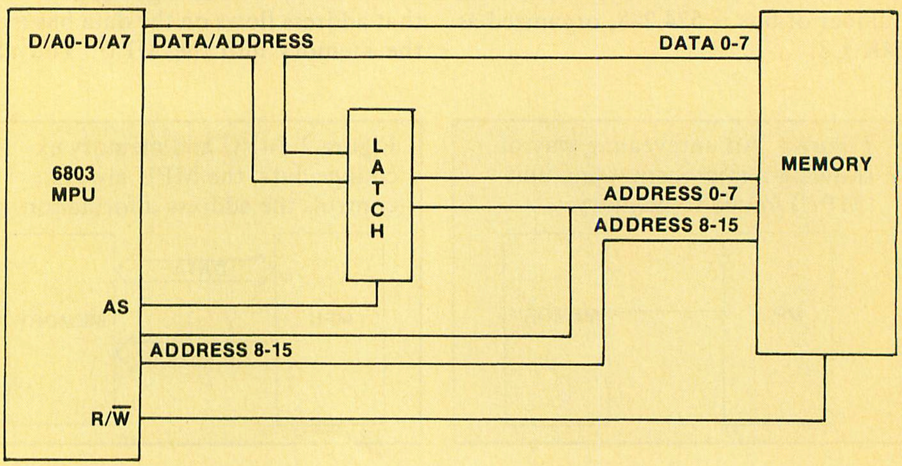


Figure 6 Address strobe AS occurs after A0-A7 are stable, but before D0-D7 appear on the same bus.

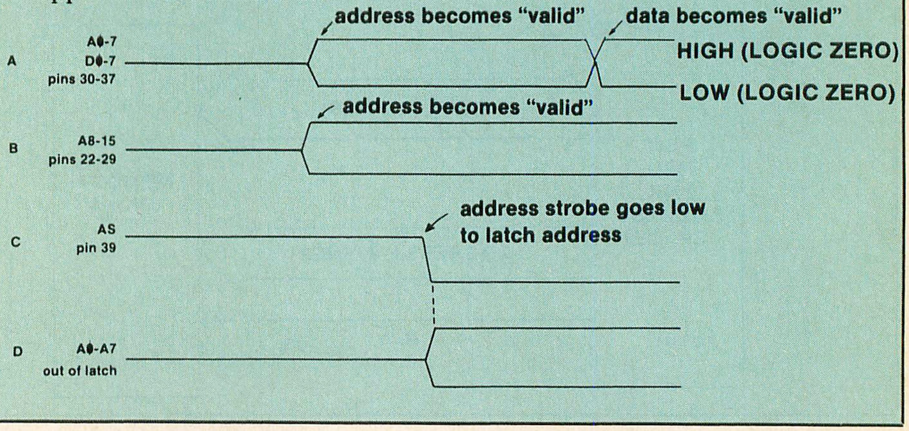
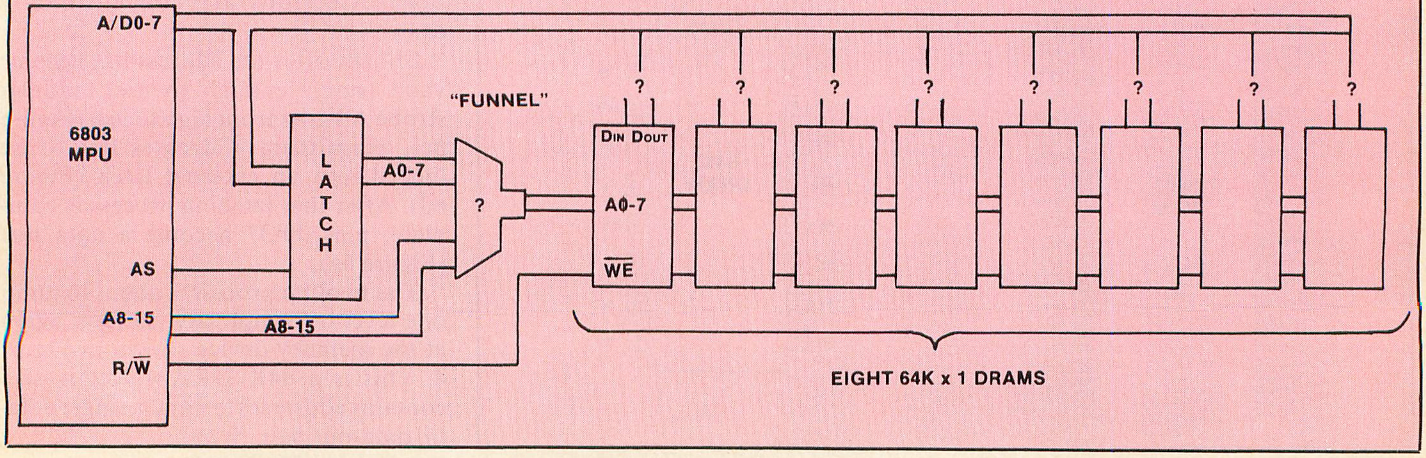


Figure 7 64K DRAMs have only eight address lines, requiring an electronic "funnel" for the 16 address lines from the MPU.



out the right. The line marked "control" either permits A0-A7 or A8-A15 to pass through.

In the real world, a single 16-line to 8-line multiplexer such as this doesn't exist. Instead, two 8-line to 4-line multiplexers are used in tandem. The diagram of one such 8-line to 4-line multiplexer (type 74LS157) is shown in Figure 9.

Now this multiplexer "funnel" can be dropped into the system being developed. Take a look at Figure 10, which shows the 74LS157 multiplexers inserted in the diagram. The 16 address lines flow into the multiplexers and eight multiplexed lines flow out to the memories.

The catch is this: Where can the three necessary signals (RAS, CAS and the multiplexer switching signal) be derived? Before attempting that, it's imperative to know in what order these signals must appear to be useful.

Look at Figure 11. The address strobe AS is shown to remind you that AS must already have happened before the address bus is complete and ready to use. Next, to provide the low half of the address (A0-A7) to the memory,

Figure 8 Ideal — but nonexistent — multiplexer has 16 lines in and eight lines out, switched by a control line.

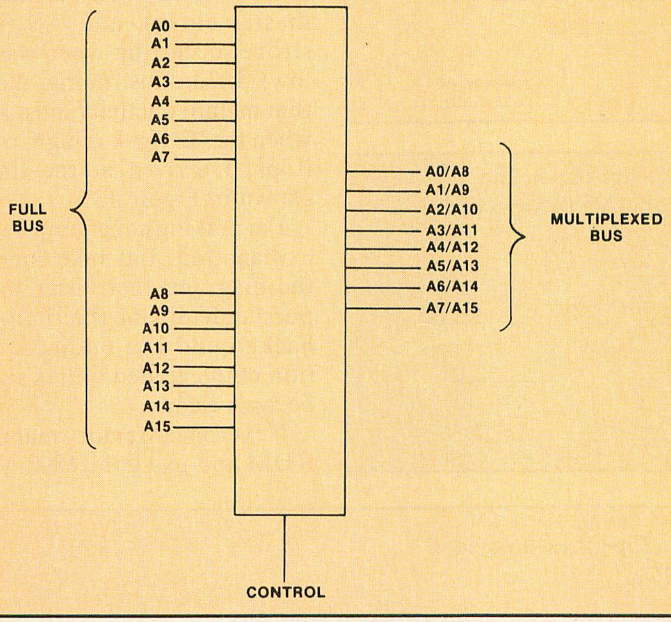

A0
A1
A2
A3
A4
A5
A6
A7
FULL BUS
A8
A9
A10
A11
A12
A13
A14
A15
A0/A8
A1/A9
A2/A10
A3/A11
A4/A12
A5/A13
A6/A14
A7/A15
MULTIPLEXED BUS
CONTROL

Figure 9 Read multiplexer type 74LS157 has eight lines in and four lines out. Two are used to multiplex a 16-line address bus.

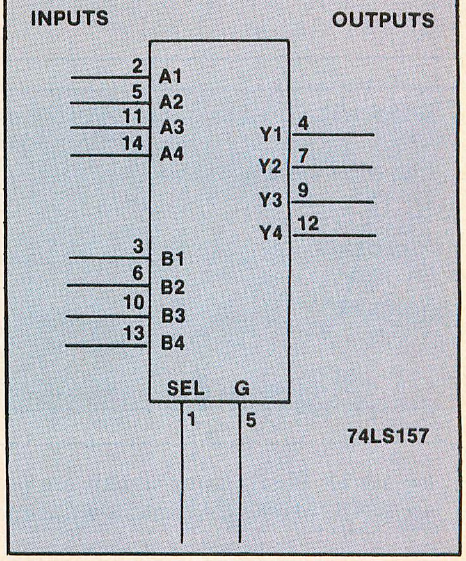

INPUTS
OUTPUTS
2
A1
5
A2
11
A3
14
A4
Y1
4
Y2
7
Y3
9
Y4
12
3
B1
6
B2
10
B3
13
B4
SEL
G
1
5
74LS157

Figure 10 74LS157s are inserted into the system, funneling the 16 address lines into the eight-address DRAMs. Signals RAS and CAS are as yet undetermined.

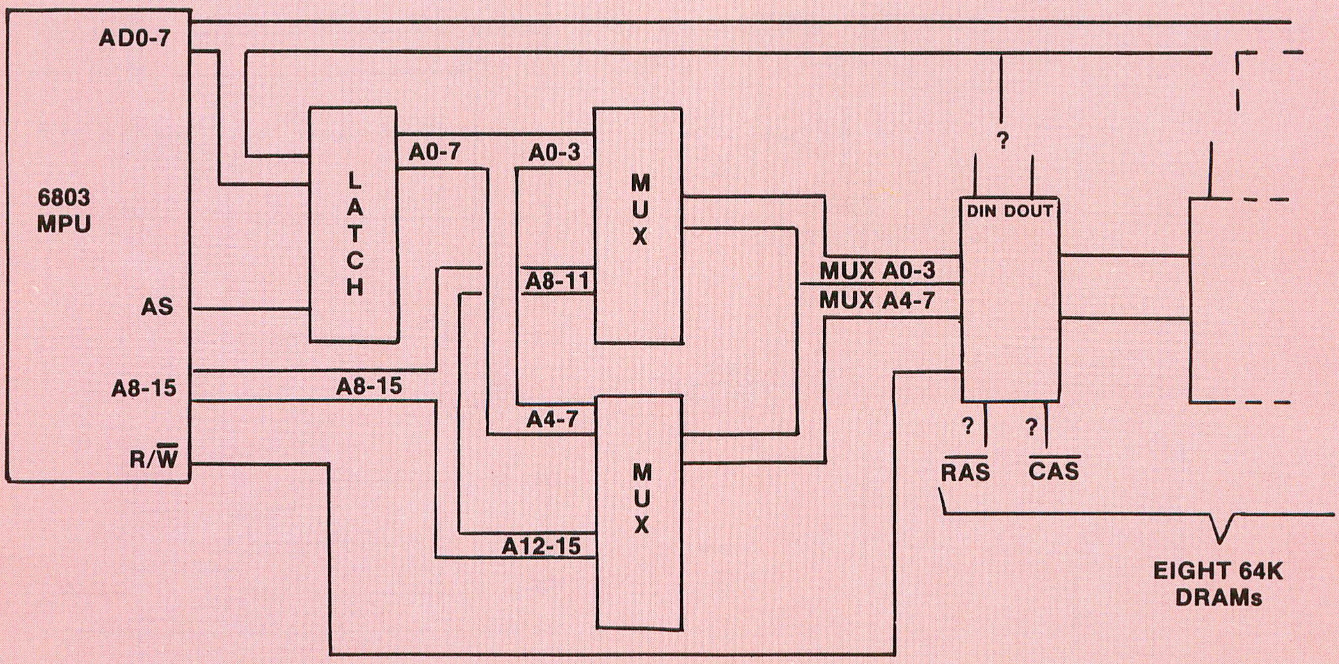

AD0-7
6803 MPU
AS
A8-15
R/$\overline{W}$
LATCH
A0-7
A0-3
A8-11
A8-15
A4-7
A12-15
MUX
MUX
MUX A0-3
MUX A4-7
?
DIN DOUT
?
?
$\overline{RAS}$
$\overline{CAS}$
EIGHT 64K DRAMs

Figure 11 Row address stobe RAS occurs first, then MUX switches the multiplexer and column address strobe CAS finishes the timing.

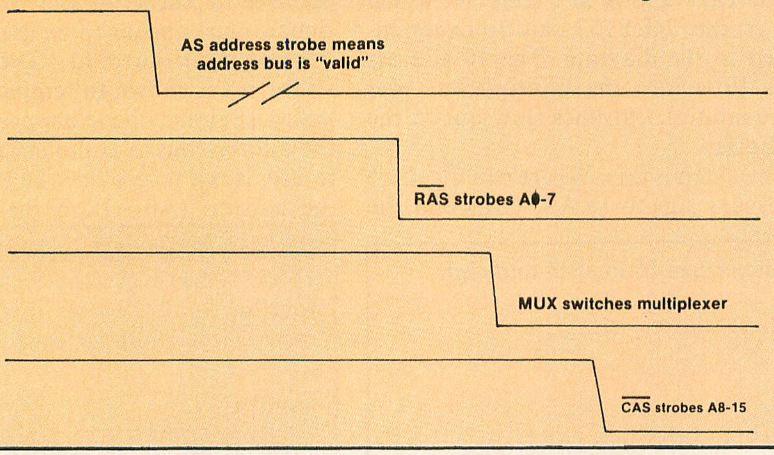
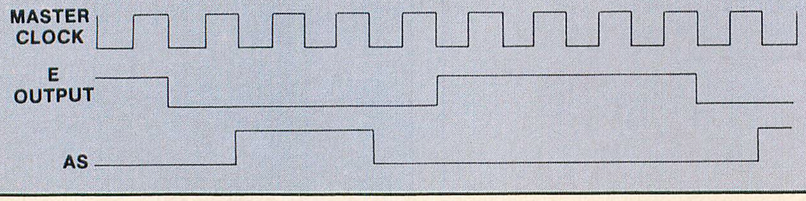

AS address strobe means address bus is "valid"
RAS strobes A0-7
MUX switches multiplexer
CAS strobes A8-15

Figure 12 In a basic 6803 MPU system, only the master clock, the 'E' clock (produced by the MPU), and the address strobe AS (produced by the MPU) are available.


MASTER CLOCK
E OUTPUT
AS

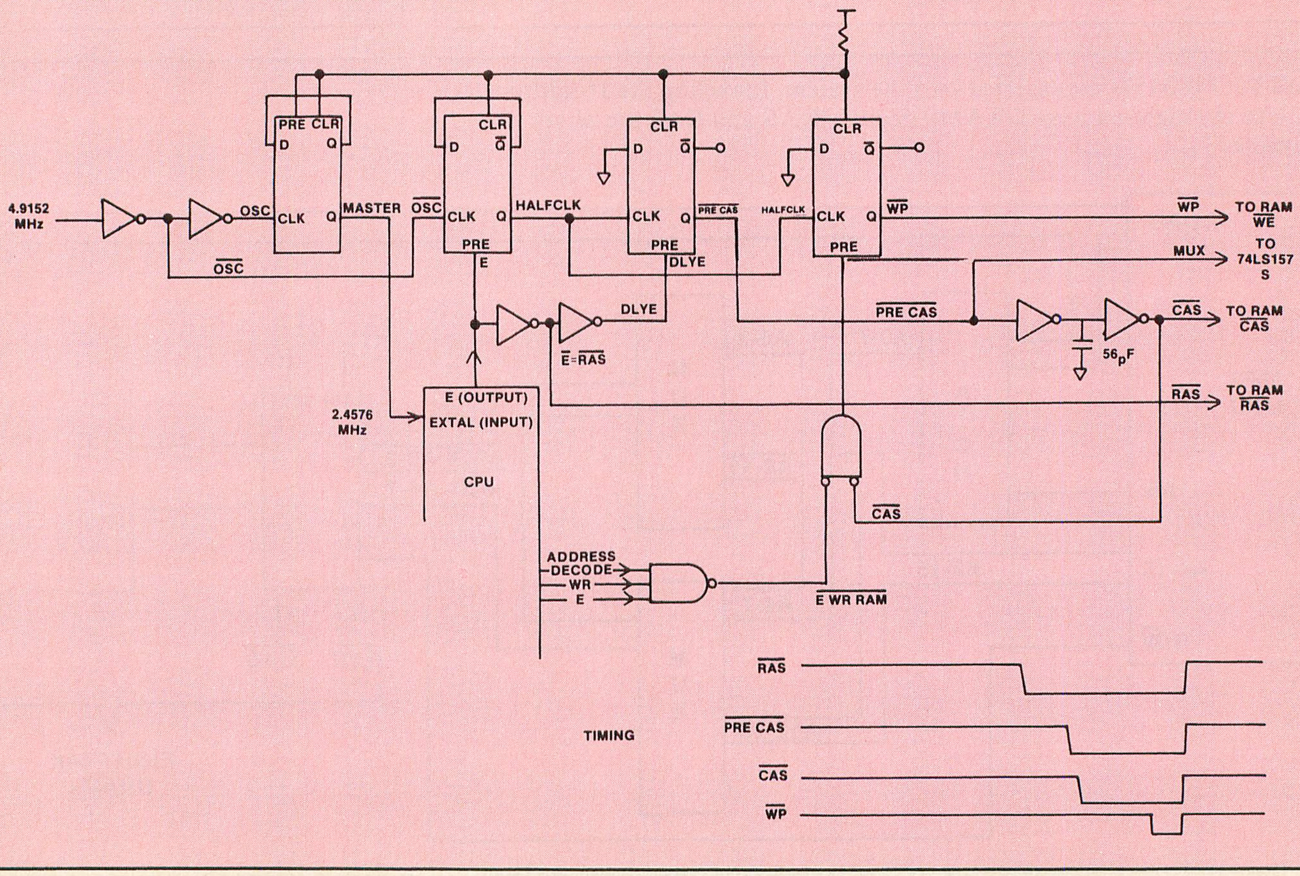
RAS appears. When that is finished, the multiplexer has to pass the second half of the addresses through; a signal — I call it MUX — switches the multiplexer. After that is complete, the final signal CAS informs the memory that the upper half of the address (A8-A15) is present.

Where does this complex stream of signals come from? Figure 12 shows what's available: a master clock (from the crystal oscillator that runs the MPU), the 'E' clock (an output from the MPU, Pin 40, which is one-quarter the master clock), and AS (the address strobe, occurring when the 'E' clock is low). Using this timing, the knowledge that memory activity must always occur when the 'E' clock is high, plus four flip-flops, I arrived at the timing circuit shown in Figure 13.

I'm making a big jump here with little explanation. But take some time with the diagram; there isn't space here to pursue details of the timing. With the background I've outlined, my production of the needed timing signals should become clear.

Next time: Memory mapping, adding ROM and using the 6803 MPU. ☐

Figure 13 Final timing signals are provided by four flip-flops. Provided are RAS, MUX, CAS and a write enable pulse, WP.


4.9152 MHz
OSC
OSC
PRE CLR
D Q
CLK Q
MASTER
OSC
CLR
D Q
CLK Q
PRE
E
HALFCLK
CLR
D Q
CLK Q
PRE
PRE CAS
DLYE
HALFCLK
CLR
D Q
CLK Q
PRE
WP
WP
TO RAM WE
MUX
TO 74LS157 S
PRE CAS
CAS
TO RAM CAS
56pF
DLYE
E-RAS
RAS
TO RAM RAS
2.4576 MHz
E (OUTPUT)
EXTAL (INPUT)
CPU
CAS
ADDRESS DECODE
WR
E
E WR RAM
TIMING
RAS
PRE CAS
CAS
WP

OS9 + X = POWER

XTERM

XTERM is a full featured OS-9 communications program that takes full advantage of the power of OS-9. It works with the normal text screen, XSCREEN, or the Wordpak 80 column board.

XTERM is menu oriented for ease of use, it is simple to use even for the novice OS-9 user. And yet, XTERM is powerful enough for the expert OS-9 user.

Some of the features of XTERM include: full upload and download support with remote buffer operation; supports XON/OFF protocol; 110/300/600/1200 baud, 5/6/7/8 bits, even/odd/no parity, full or half duplex; able to execute an OS-9 shell command from within XTERM.

XTERM works with a Color Computer using the standard serial interface, but also will work with a hardware serial port. Also, if you are using a hardware parallel printer port, you can print data to the printer as it is received.

Now includes XMODEM protocol and function keys.

XTERM $59.95

WITH SOURCE
$99.95

XMENU

XMENU is a system that creates a menu-driven environment for the Color Computer using OS-9. OS-9 now becomes easy-to-use with command selections made from menus. Menus are included to access OS-9 commands. An easy-to-use utility is provided that allows for the creation and maintenance of menus.

XMENU works with XSCREEN, the normal text screen, O-PAK, and the WORDPAK 80-column board.

XMENU $29.95

WITH SOURCE
$59.95

XSCREEN

XSCREEN creates a high resolution screen for the Color Computer using OS-9. This high resolution screen gives you 24 lines of text with 51, 64, or 85 characters per line. Characters can be either white on a black background or vice versa. Easy menu operation.

XSCREEN $19.95

WITH SOURCE
$39.95

XDIR & XCAL

A package of two powerful utilities you won't want to be without. XDIR is an OS-9 directory program that prints full hierarchical directories. The directory does full sorting and has complete pattern matching, including wildcard and character classes.

XCAL is a powerful calculator for OS-9. Ideal for both programmers and for general use. XCAL features include: work in decimal, hexadecimal, binary; previous 25 results are stored; functions include AND, OR, NOT, XOR.

XDIR & XCAL $24.95

WITH SOURCE
$49.95

XWORD

XWORD is a powerful word processing system for the Color Computer using OS-9. XWORD is feature packed with only a few features mentioned here.

Some of the editing features of XWORD include: true character oriented full screen editor; works with the normal text screen, XSCREEN, O-PAK, or WORDPAK 80 column card; full block commands with blocks displayed in inverse characters (except with normal text screen) for easy block manipulation; file size not limited to a buffer size; full find and replace commands with wildcard character; able to execute an OS-9 shell command in the middle of editing. Many, many more features, too many to mention here.

Some of the formatting features of XWORD include: proportional spacing supported; perfectly aligned hanging indents and columns, even when using proportional characters; full printer control with control of character size, emphasized, italics, overstrike, underlining (with or without spaces), super and sub-scripts; up to 10 header/footers; page numbering in decimal or Roman numerals; margins and headers can be set differently for even and odd pages; automatically reads printer initialization file to define XWORD for your printer (many included, and easy to write or modify your own). Many more features.

XWORD $79.95

WITH SOURCE
$139.95

XSPELL

OS-9 spelling checker program to check for spelling errors in OS-9 text files. Includes 20,000 and 40,000 word dictionaries.

XSPELL $44.95

NEW

XMERGE

XMERGE gives XWORD powerful mail merge capabilities. With it you are able to merge in data from a data file or from the keyboard to get professional looking results.

XMERGE $29.95

WITH SOURCE
$59.95

XTRIO

XWORD, XMERGE, and XSPELL all for $129.85. That's a savings of $25.00.

XTRIO $129.85

WITH XWORD,
XMERGE SOURCE
$199.95

XED

XED is the editor portion of XWORD. XED includes all of the editing features listed under XWORD above. XED is for people who need a full featured screen editor but do not need all of the formatting power of a word processor.

XED $49.95

WITH SOURCE
$99.95

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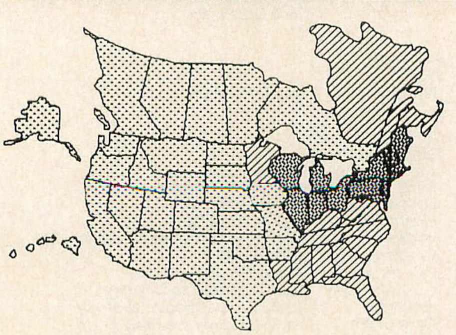

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SO WHAT!

1x, 2x, 3x

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Now that you have created a library of **PRETTY** graphics, what can you do with them? How about printing cards, labels, and giant posters! **HARDCOPY** is more than just a screen print utility, compare these features with any other graphic dump program on the market;

- Full GRAPHICOM/GRAPHICOM PART II compatibility! Loads STANDARD 6K images, GRAPHICOM pictures, and COCO MAX pictures too!
- BLACK & WHITE or GREY SCALE printing. In GREY SCALE printing, colors are printed as user definable patterns. Supports hi-res in all 4 GRAPHICOM display modes!

HARDCOPY* requires a 64K Color Computer or Color Computer II, and at least one disk drive. It supports 1 to 4 disk drives, keyboard or joystick input, COLOR (grey scale) or B/W (hi-res) operation, 4 screen display modes.

* Due to hardware differences, some features may function differently on certain printers.

Hardcopy will be available for most of the popular printers. Additional printers will be added each month. Please specify printer and cat. number when ordering.

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DISK ACCESS

The disk option provides the user with access to standard 6K images, GRAPHICOM and GRAPHICOM PART II files, and COCO MAX files too! "GALLERY" function allows viewing of all pictures on a disk. Supports 1 to 4 disk drive system.

Have an application that **HARDCOPY** doesn't quite match? You can write it easily yourself! The hard work's been done for you, we've FULLY DOCUMENTED the **HARDCOPY** routines and added them to EXTENDED BASIC through the USR command!

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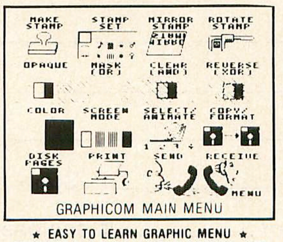

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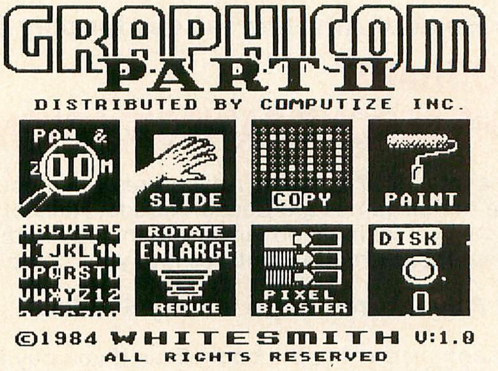
★ EASY TO LEARN GRAPHIC MENU ★
REQUIRES 64K COCO, 1 DRIVE SYSTEM, AND 2 ANALOG JOYSTICKS



Graphicom Part II is a video processing package that provides many functions that are missing in Graphicom. Here are just a few of the features provided by Graphicom Part II:

ENLARGE/REDUCE/ROTATE
Enlarge or reduce any portion of a screen by any amount, just like a photographic enlarger! Independent of the enlargement or reduction, rotate by any degree or fraction of a degree about any point on the screen.

PAINT
No more clumsy "stamping" to get your colors! Paint or "fill" any irregular area on the screen! More than 50 different colored patterns available. Unlike Extended Basic's PAINT command, painting will stop at any boundry. Undo or "Oops" function allows experimenting, and prevents time consuming mistakes. Additional paint patterns may be user-defined.

PAN & ZOOM
"Zoom in" x2, x4, or x8 on any portion of the screen to do fine pixel work. Allows editing of Graphicom character sets with ease!

TYPESETTER & FONT EDITOR
Add text in 16 different sizes with several display modes to chose from including COLORED FOREGROUND & BACKGROUND text! Edit 8x8 characters for use in the typesetter. Over 30 character sets supplied on disk. "GRAB" function allows transfer of some Graphicom character sets to Graphicom Part II format.

PIXEL BLASTER
Allows the user to easily substitute or remove colors. Widen lines, swap BLUE & RED without effecting BLACK & WHITE, etc.

GRAPHICOM PART II DOES NOT REQUIRE GRAPHICOM TO RUN!
Graphicom Part II requires a 64K extended disk basic system, it will load and save both standard BIN files and Graphicom screens, and supports 1 to 4 disk drives with keyboard or joystick (analog or switch type). All functions support color or Hi-Res operation as well as 4 screen display modes

Cat. No. 132WD

GRAPHICOM PART II-$24.95

PICTURE DISKS $9.95

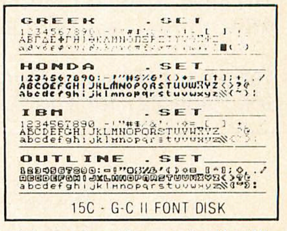
Available from COMPUTIZE

4C - Artifact color palette
5C - Large character sets drawn with master design (from Derringer Software)
6C - Same as 5C but set up as stamp set
7 - Miscellaneous Art Set #1
8 - Miscellaneous Art Set #2
9 - Miscellaneous Ads and Examples
10 - Miscellaneous Fonts
11C - Artifact color palette type fonts

12C - Art demo from WHITESMITH
Color Hi-res artworks from Whitesmith, the people that brought you Graphicom Part][, introduced by an animated marching band performing a Sousa march in 4-part harmony!

13C - GRAPHICOM PART II function demo

GCII FONT DISKS



15C - G-C II FONT DISK

Each disk contains 40 or more font files (10 or more GRAPHICOM PART][fonts, 4 versions of each, one for each display mode) and three "FONT INDEX" screens to make identification and selection easy.

14C - GCII Fonts Disk #1 Cat. No. 157WD
15C - GCII Fonts Disk #2 Cat. No. 158WD
16C - GCII Fonts Disk #3 Cat. No. 159WD

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ROM PAK	Cat. No. 160HR	$ 99.95
ROM PAK With Extension Cable	Cat. No. 161HR	$109.95

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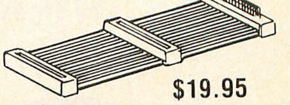

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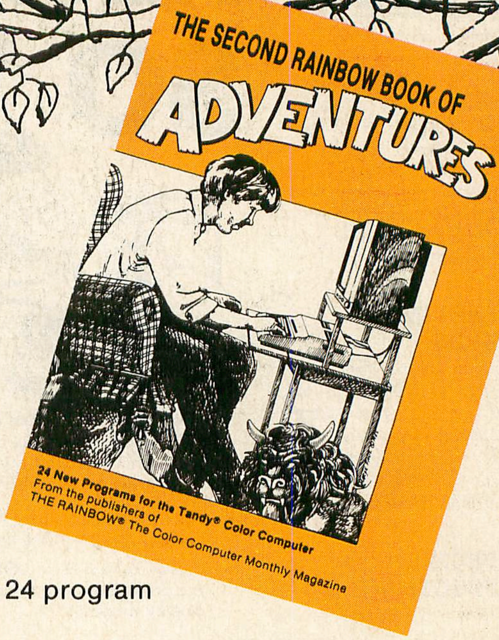
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Ice Princess — Just one glance at this beauty will steal your heart.
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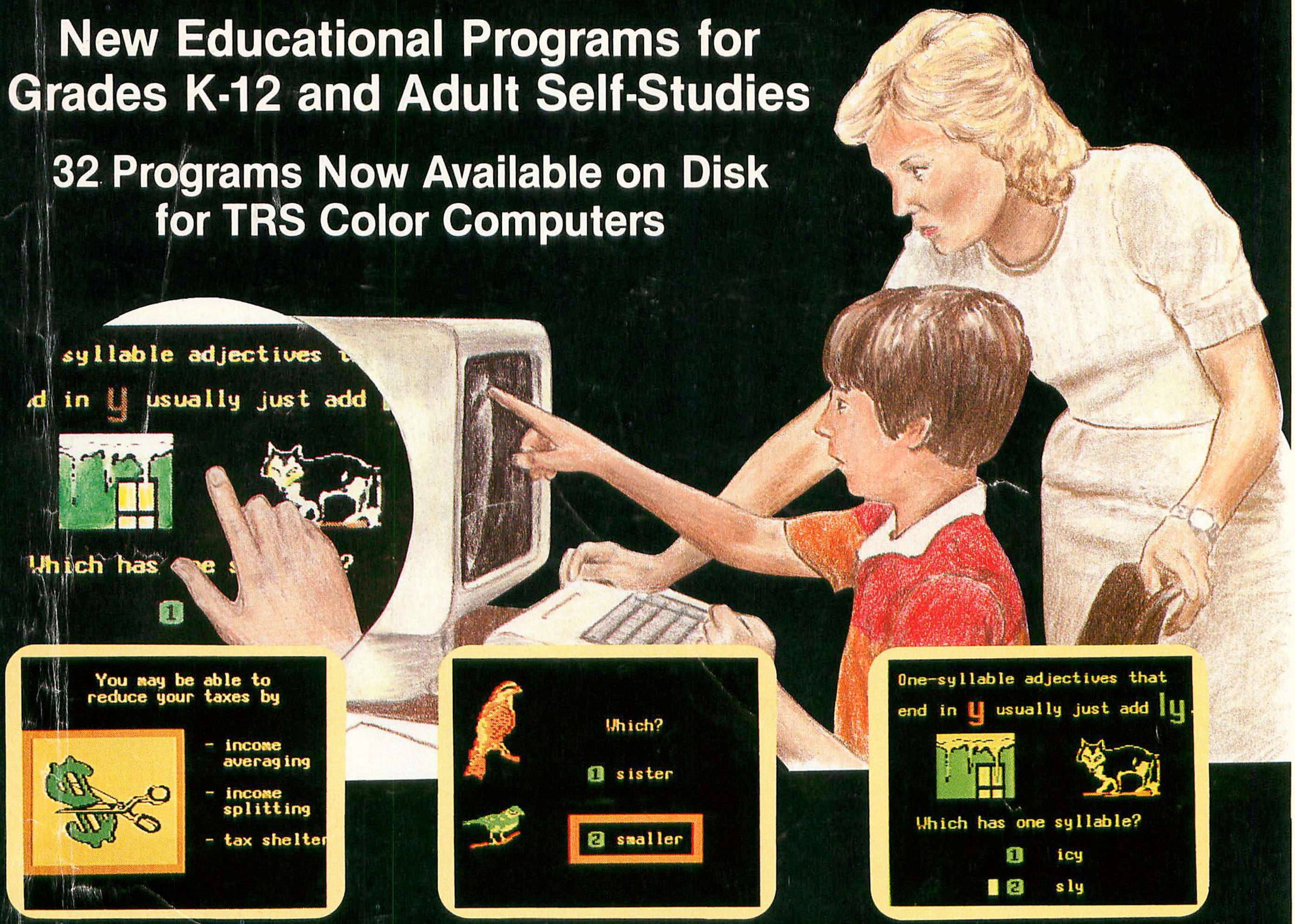
syllable adjectives
d in y usually just add
Which has one s ?
1
You may be able to reduce your taxes by
- income averaging
- income splitting
- tax shelter
Which?
1 sister
2 smaller
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Which has one syllable?
1 icy
2 sly

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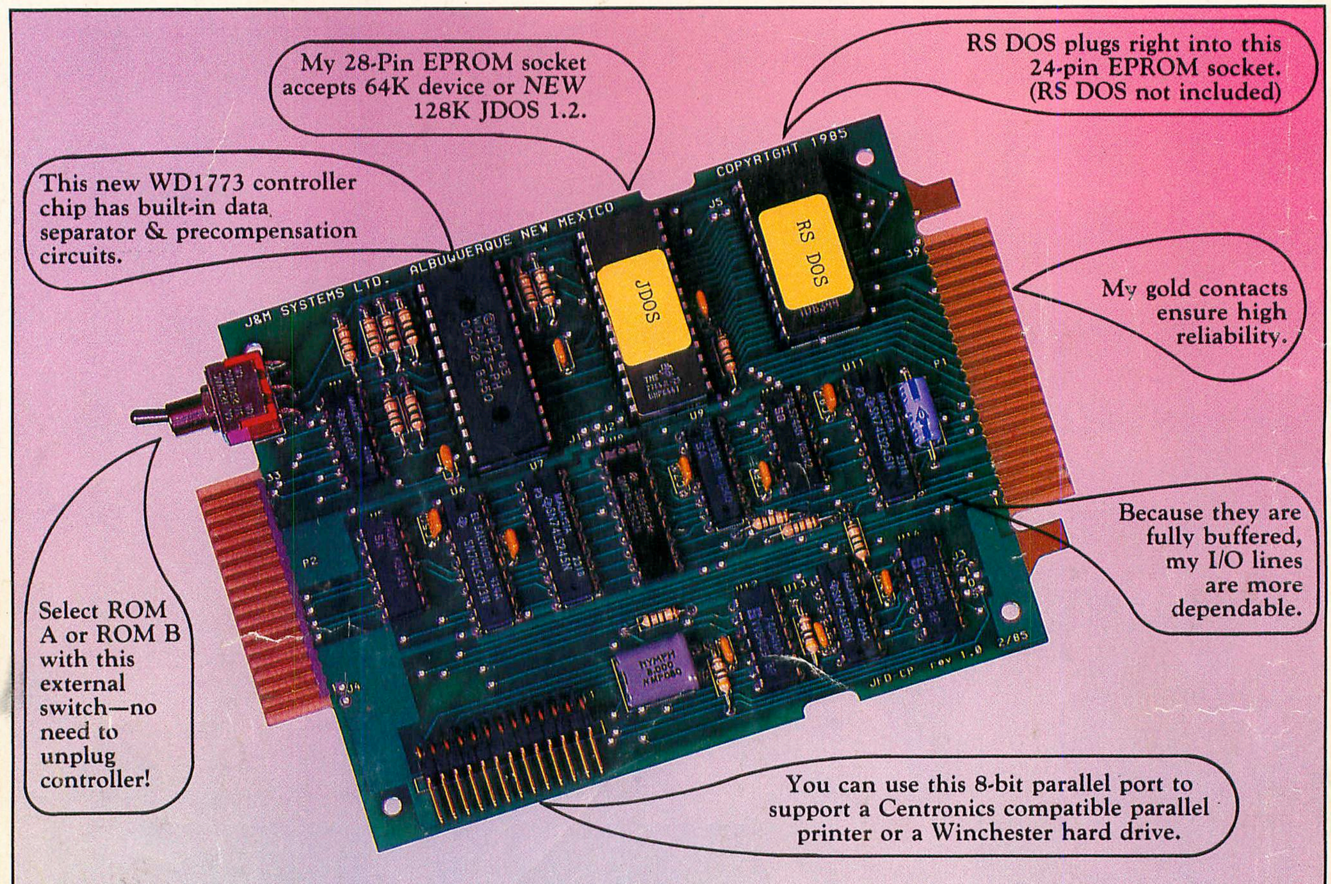
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RS DOS
JFD-CP rev 1.0 2/85

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